

**RICHARD B. RUSSELL  
POWERPLANT**

**CIRCUIT BREAKER AND STATIC  
START SYSTEM INSTALLATION**

**CONSTRUCTION  
SOLICITATION NUMBER  
DACW21-03-B-0011**

RICHARD B RUSSELL GENERATOR CIRCUIT BREAKERS AND STATIC START SYSTEM  
INSTALLATION

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NOT USED

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NOT USED

## SECTION 01005

## DESCRIPTIVE/SPECIFICATIONS

## PART 1 GENERAL

## 1.1 DESCRIPTION OF WORK

This section covers the technical specifications to perform the work required for the replacement of the existing main unit circuit breakers (Units 1-4 oil filled, Units 5-8 Air blast) with new Government-Furnished SF-6 15 kV circuit breakers and to install a new Government-furnished static start system at the Richard B. Russell Powerhouse. All work and quantities are for eight (8) Units unless specifically stated otherwise in these specifications. This list is a general summary of the required work and is not all inclusive.

## 1.2 ELECTRICAL WORK

- a. Perform generator circuit breaker replacement.
- b. Replacement of cable and conduit.
- c. Installation of new Government-furnished static start System.

## 1.3 MISCELLANEOUS WORK

- a. Perform all work required to comply with the site operations, environmental protection, and safety and health provisions.
- b. Perform all work required for painting.
- c. Perform all work required for coating the transformer deck.
- d. Perform all work required for concrete removal, concrete placement, bonding, drilling, and grouting.

## 1.4 SPECIFICATIONS

Technical specifications listed below cover the detailed requirements for the equipment and services listed in the Schedule:

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## 1.5 CHANGES IN SPECIFICATIONS AND DRAWINGS

The Government reserves the right to revise or amend the specifications and/or drawings prior to the date set for opening. Copies of such amendments will be furnished to all prospective bidders. If the revisions and amendments require material changes in quantities or prices bid, or both, the date set for opening bids may be extended to enable bidders the opportunity to revise their technical proposals and/or bids. The amendment will include an announcement of the new date for opening bids.

## 1.6 DEFINITIONS

### 1.6.1 Directed, Required, Ordered, Designated, Prescribed

Wherever in the specifications or upon the drawings the words "directed," "required," "ordered," "designated," "prescribed," or words of like import are used, it shall be understood that the "direction," "requirement," "order," "designation," or "prescription" of the Contracting Officer is intended and similarly the words "approved," "acceptable," "satisfactory," or words of like import shall mean "approved by," or "acceptable to," or "satisfactory to" the Contracting Officer unless otherwise expressly stated.

### 1.6.2 As Shown, As Indicated, As Detailed

Where "as shown," "as indicated," "as detailed," or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise. The word "provided" as used herein shall be understood to mean "provided complete in-place," that is "furnished and installed." (FAR 52.236-21 (b and c).)

### 1.6.3 Contracting Officer (CO), Contracting Officer's Representative (COR)

Wherever in these specifications or upon the drawings the words "Contracting Officer" (CO) or "Contracting Officer's Representative" (COR), are used, it shall be understood to also mean "Government" unless otherwise expressly stated.

### 1.6.4 Government Quality Assurance Representative (GQAR)

Wherever in these specifications the word "GQAR" is used, it shall be understood to mean "Government Quality Assurance Representative," unless otherwise stated.

### 1.6.5 Weekend(s)

Wherever in these specifications the word "weekend(s)" is used, it shall be understood to mean "Saturday, Sunday and Federal Holidays," unless otherwise expressly stated.

## 1.7 QUALIFICATIONS

The circuit breaker installation Contractor shall be regularly engaged, for a minimum of three consecutive years, in the, testing, assembly and installation of circuit breakers of similar type and rating as those required in these specifications. The circuit breaker installation Contractor shall have a minimum of three completed and commercially operational SF6 circuit breaker installations rated at 15kV and above, three-phase. The Contractor shall submit the location and rating of equipment and the year it was installed, and other such information which will show ability of the circuit breaker installation Contractor to meet these qualifications and to perform the work required by these specifications. Bidders are required to submit with their bids, POC's, locations, name, and general description of at least three (3) to a maximum of five (5) contracts of similar scope, complete with monetary value, and date of completion along with bank references. The bidder may be considered non-responsive for failure to meet these requirements.

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SECTION 01010

CONTRACTOR'S SITE OPERATIONS

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PART 2 PRODUCTS

(Not Used)

PART 3 EXECUTION

(Not Used)

SECTION 01010

CONTRACTOR'S SITE OPERATIONS

PART 1 GENERAL

1.1 GENERAL

This section covers the general requirements applicable to specific Contractor's operations or equipment for work performed on site.

1.2 SUBMITTALS

Submittals required by this section of the Technical Specifications shall be for Government approval (GA) or for information only (FIO), and shall be submitted as stated below in accordance with SECTION 01300.

SD-01 Data

Roadway access agreement, a minimum of 30 calendar days prior to use, paragraph 1.3.1; FIO

Location of job-site office(s), a minimum of 30 calendar days prior to office erection, paragraph 1.3.3; GA

Content and location of signage, a minimum of 5 calendar days prior to erection, paragraph 1.3.3.; GA

Method of identifying Contractor's vehicles, a minimum of 30 calendar days prior to the start of site work, paragraph 1.5.2.; GA

Procedure for identification and control of employees entering or leaving site, a minimum of 30 calendar days prior to the start of site work, paragraph 1.5.; GA

Contractor's working hours, shifts, and days of the week to be worked, including an estimate of the number of employees working per shift, a minimum of 60 calendar days prior to the start of site work, paragraph 1.6.2.; GA

Location of Contractor's sanitation facilities, a minimum of 30 calendar days prior to office erection, paragraph 1.8.1.; GA

Temporary utility connections, a minimum of 5 calendar days prior to the connection, paragraph 1.9.1; GA

Project report giving project status, activities, and current project schedules within the first week of each month of site work, paragraph

1.13; FIO

Site work schedule, paragraph 1.15; GA

Crane operator(s) qualifications and current medical exam, a minimum of 5 calendar days, excluding weekends, prior to performance of work, paragraph. 1.18.3; GA

Crane rigger's qualifications, a minimum of 5 calendar days, excluding weekends, prior to performance of work, paragraph 1.18.4; GA

List of all equipment, a minimum of 30 calendar days prior to the start of site work, paragraph 1.19; FIO

An up-to-date list of all plant and equipment, with the end-of-month request for payment throughout the life of the contract, paragraph 1.19; FIO

A plan and method of transportation and operation of cranes and heavy equipment, a minimum of 60 calendar days prior to their transportation and site operation, paragraph 1.20.1; GA

List of equipment and materials proposed for temporary storage within Government allocated staging areas, a minimum of 20 calendar days prior to their storage, paragraph 1.21; GA

Method and plan of protection for materials and equipment, a minimum of 60 calendar days prior to the start of site work or in areas to be protected, paragraph. 1.24; GA

Location of Contractor's miscellaneous buildings, a minimum of 30 calendar days prior to their erection, paragraph 1.25; GA

Any scaffolding, ladder, stairway, or other access schemes proposed, a minimum of 60 calendar days prior to their installation and use, paragraph. 1.28; GA

Location of disposal area and plan for disposal, a minimum of 60 calendar days prior to the disposal, paragraph 1.29; GA

Dust and fume control program, a minimum of 60 calendar days prior to the start of site work, paragraph 1.30.2; GA

Qualifications and identification of Contractor's agent(s), a minimum of 30 calendar days prior to the start of site work, paragraph 1.37.1; GA

Organization chart, a minimum of 10 calendar days prior to the start of site work, and updated weekly thereafter to reflect the current organization, paragraph. 1.37.2.1; FIO

List of personnel working on the site, a minimum of 10 calendar days prior to the start of site work and updated weekly thereafter to reflect a current listing, paragraph. 1.37.2.2; FIO

#### SD-08 Statements

Blockage of roadway lane(s), with description of traffic control measures, a minimum of 24 hours, excluding weekends, prior to the blockage, paragraph 1.3.1; GA

Request to change schedule of regular work hours, etc., 48 hours in advance of change in schedule, paragraph 1.6.2; GA

Request for copies of the Richard B. Russell Powerplant Safe Clearance Procedure program, paragraph 1.16; FIO

Request for use of powerhouse bridge crane, a minimum of 5 calendar days prior to first use, paragraph 1.18.1; GA

Notice of finding damaged equipment or other abnormal conditions of equipment or parts, four hours after discovery, paragraph 1.23; FIO

Request for copies of data and drawings, at Contractor's discretion, paragraph 1.36; FIO

### 1.3 WORK AREAS AND ACCESS

#### 1.3.1 Access Roads, General

No new access roads are required. Any Contractor caused damage to existing roadways that are used for access purposes shall be repaired and the surface shall be restored to its pre-damaged condition, less normal wear. Special requirements of the property owner or State and County authorities with which the Contractor is expected to comply for use of existing roadways, such as traffic regulations, load limits, maintenance and dust control during construction, restorations, or improvements after completion of the work, will be agreed to in writing by the Contractor and the party or parties concerned. A copy of the agreement shall be furnished to the Contracting Officer before use of roadways begin. Both lanes of roads shall not be blocked by the Contractor. If one lane is blocked, the Contractor shall provide the necessary flaggers, based on the visibility, to control traffic. The Government shall be notified in advance of any blockage. The Government will make the final determination on whether adequate traffic control measures have been taken.

#### 1.3.2 Access By Government Personnel

Clear access shall be maintained for Government personnel and equipment through all work areas.

### 1.3.3 Contractor's Office Area and Employee Access

The Contractor's job-site office shall be located as shown on the contract drawings. Any alternate job-site office location shall be submitted for approval. The project areas off-limits to Contractor personnel will be as designated by the Contracting Officer. Salespersons or personnel seeking employment will not be permitted inside the powerhouse. Signs may be erected outside the powerhouse containing instructions for personnel seeking the Contractor. The content and location of the signs shall be submitted for approval.

### 1.3.4 Government Roadways

Access to the work areas on the El. 350.0 service deck by heavy construction vehicles or truck cranes, shall be limited. These areas are load limited to HS-20-44 AASHTO (American Association of State Highway Transportation Officials) load. For any vehicles in excess of this capacity, a loading diagram shall be submitted for review and approval showing the wheel loads and wheel spacing. If it becomes necessary to cross the gate slots at any unit by heavy construction vehicles, a one-inch thick steel plate that spans the slots shall be laid down over the area to be crossed. Prior approval for such crossings shall be obtained. Vehicles in excess of the AASHTO load shall not cross the gate slots.

## 1.4 RESERVED

## 1.5 PROJECT SECURITY

### 1.5.1 General

The powerplant is accessed through a key actuated motorized security gate at all hours. A procedure shall be submitted for approval for identification and control of employees entering or leaving the project. The security of the Contractor's property and items furnished under this contract, until accepted, are its responsibility whether stored inside or outside the powerhouse.

### 1.5.2 Identification of Vehicles

All Contractor's vehicles shall display approved permanent identification of such size and color to allow Government personnel to identify the vehicle.

## 1.6 SITE WORKING HOURS

### 1.6.1 Government Project Personnel Working Hours

The working hours of the project staff are Mondays through Fridays from 6:30 a.m. until 4:00 p.m.

#### 1.6.2 Contractor's Working Hours

A proposed schedule of work hours, shifts, and days of the week shall be submitted within 30 calendar days after contract award. Notification of any proposed changes of the schedule of regular work hours, overtime work hours, and shifts of work crews and personnel at the site shall be submitted (at least 48 hours in advance of change in work schedule).

#### 1.7 WORK BY THE GOVERNMENT CONCURRENT WITH CONTRACTOR WORK

The Government will limit interference with the Contractor's work to a minimum duration possible.

#### 1.8 EXISTING FACILITIES

##### 1.8.1 Sanitation Facilities

Existing restroom facilities will not be made available for use by Contractor personnel. The Contractor shall provide his own sanitation facilities furnished in accordance with EM 385-1-1. The Contractor's sanitation facilities shall be located outside the powerhouse at approved locations. The Contractor shall provide freeze protection during the months October through March to prevent any spillage.

#### 1.9 UTILITIES

##### 1.9.1 General

All utilities provided by the Government shall be at no cost. Care shall be exercised in conserving all Government-furnished utilities. Extension cords shall be Contractor-furnished. All temporary utility connections shall be subject to approval. The location of all power lines and all temporary connections for electricity shall be subject to approval. Power cords on the El. 350.0 service deck shall not block gantry crane travel. All temporary circuits and devices shall be Contractor provided, connected, and maintained and removed prior to final acceptance. All electrical hardware furnished and used by the Contractor and connected to Government equipment shall fully interface with existing equipment. Ground fault protection for all circuits used shall be Contractor-furnished. All utilities that are required for use in performance of the work under this contract shall be Contractor-furnished except as noted below:

a. Water. All reasonable amounts of non-potable water will be made available from existing outlets. The Contractor shall freeze proof all water systems being used in his operations during the winter months October through March.

b. Electricity. Electric power in the area for each unit may be obtained from the following existing sources at each unit.

One - 480-volt, 3-phase 30-ampere (maximum) circuit

c. Compressed Air. Up to 100 scfm (total) of compressed air (nominal pressure of 100 psig) will be provided from existing 3/4-inch outlets.

#### 1.9.2 Telephone

The Contractor shall be responsible for having the telephone company furnish all telephone service needed on the job site. The project telephone system will not be available to the Contractor.

#### 1.10 SITE INVESTIGATIONS AND CONDITIONS AFFECTING THE WORK

The Contractor shall take steps reasonably necessary to ascertain the nature and location of the work, and investigate the general and local conditions that can affect the work or its cost. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expenses to the Government. The Government assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the Government. Nor does the Government assume responsibility for any understanding reached or representation made concerning conditions, which can affect the work by any of its officers or agents before the execution of this contract, unless the understanding or representation is expressly stated in this contract. Site conditions, which should be investigated, include, but are not limited to:

a. Conditions bearing upon transportation, disposal, handling, and storage of materials

b. The availability of labor, water, electrical power, and roads

c. Uncertainties of weather, river stages, tides, or similar physical conditions at the site

d. The conformation and conditions of the ground and equipment and facilities to be replaced and/or rehabilitated

e. The character of equipment and facilities needed preliminary to and during work performance

f. Amount of workspace, accessibility, lighting, etc.

#### 1.11 PERMITS AND RESPONSIBILITIES

The Contractor shall, without additional expense to the Government, be responsible for obtaining any necessary licenses and permits, and for complying with any Federal, State, and municipal laws, codes, and regulations applicable to the performance of the work. The Contractor shall also be

responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence, and shall take proper safety and health precautions to protect the work, the workers, the public, and property of others. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work, which may have been accepted under the contract.

#### 1.12 BARRICADES DANGER, DETOUR AND WARNING SIGNS

##### 1.12.1 Barricades, Danger and Detour signs

The Contractor shall provide, erect, and maintain all necessary barricades, suitable and sufficient red lights, danger signals, and detour and other signs; provide a sufficient number of watchmen; and take all necessary precautions for the protection of the work and the safety of the public. Roads or access ways closed to traffic shall be protected by effective barricades, and the obstruction shall be continuously illuminated day and night. Lanterns or flares shall illuminate suitable warning signs day and night.

##### 1.12.2 Warning Signs

Warning signs shall be erected 500 feet in advance of any place on the project where operations interfere with the use of a road by traffic. Warning signs shall conform to the standards established in Part IV of the "Manual on Uniform Traffic Control Devices for Streets and Highways," published by the U.S. Dept. of Transportation.

#### 1.13 PROJECT REPORTING

Monthly reports shall be prepared giving the project status and activities information. An updated CPM should be included in this report. This report shall include a written summary, accompanied with detailed information relating to current status of procurement, construction, and delivery activities, and an updated site work schedule.

#### 1.14 WEEKLY MEETINGS

Once each week a general meeting will be held between the Contractor and the Government. This meeting will be used to discuss progress in the last week and work planned in the up coming week. A meeting time and place shall be mutually agreed upon.

#### 1.15 SITE WORK SCHEDULE

##### 1.15.1 General

A site work schedule shall be prepared. The schedule shall include a detailed critical path diagram (CPM), featuring major and minor work elements

and stages of the work. This schedule shall be updated and submitted with the monthly progress report to reflect the actual work elements and progress, and that anticipated in the future.

#### 1.15.2 Sequence of Work

The Contractor's critical path diagram shall be prepared to provide the sequence of work outlined in SECTION 16050, to provide maximum pumping capability throughout construction. Any problems that the Contractor encounters or that the Contractor foresees that would impact ongoing pumping capability throughout construction shall be immediately brought to the attention of the COR.

#### 1.16 SAFE CLEARANCE PROCEDURES

A Safe Clearance System, as stated in EM-385-1-1 and South Atlantic Division Uniform Interpretation of ER 385-1-31, is used by project personnel to insure continuity of service and safety to personnel and equipment. Any work performed which requires taking project-operating equipment out of service will be done only after a formal clearance is obtained by the Government with a 24-hour minimum notice. After the Government clearance tag has been placed on the equipment, the Contractor shall place his own clearance tag on the equipment. Contractor personnel shall not violate safe clearance procedures, and any violations will be grounds for requesting the removal of the offender(s). Up to 5 copies of the Richard B. Russell Powerplant Safe Clearance Procedure program will be supplied to the Contractor upon request.

#### 1.17 GENERATING UNIT AVAILABILITY

The Government will arrange for the unit outages. Not more than two units may be out of service at a time unless otherwise approved. All work shall be coordinated to limit the length of the unit outage. All work performed on units taken out of service shall not impair the capability of the Government to operate equipment not taken out of service. All outages required shall be obtained through the Government seven calendar days in advance. An attempt will be made to make units available on the dates the Contractor desires, and in accordance with the approved site schedule; however, power demands and emergency maintenance requirements may limit unit availability. Should this occur, the Contractor will be notified. The first day of availability shall not be a weekend day.

#### 1.18 USE OF POWERHOUSE BRIDGE CRANE

##### 1.18.1 General Information

There are two bridge cranes available for Contractor use at the powerhouse. One bridge crane has two 150-ton hoists for a net 300-ton capacity; the other has two 25-ton hoists for a 50-ton capacity. The bridge crane will be made available, upon request, to the Contractor for use. The Contractor shall provide crane operator(s) and rigger(s) to operate the crane through the duration of the on-site work. Crane usage scheduling shall be discussed at

the weekly Contractor/Government site meeting. Upon completion of the use of the crane and Government furnished lifting devices, and prior to final acceptance of the work, cranes and lifting devices used by the Contractor shall be restored to previous condition less fair wear and tear, as directed. The Contractor will be held liable for all damages incurred as the result of the negligent operation or use of the crane. The Contractor shall report all problems encountered with the crane immediately to the Government. The Government has the right to board the crane at any time for inspection and observation of crane operation.

#### 1.18.2 Emergency Crane Usage and Scheduled Maintenance

The Contractor shall cooperate with the Government in the use of the crane for scheduled and emergency project maintenance. The Government will perform all regular scheduled maintenance and lubrication. The Government will have priority use of the crane in emergency conditions, e.g., for needed use that could not be foreseen or scheduled. Government maintenance and repair of cranes will not be a basis for Contractor claim for delay. As a guide, the following information on crane usage for existing project maintenance is furnished. The information is general and subject to changes in operating procedures and by emergency situations. The Government will furnish its own operators and riggers in these situations.

- a. Biannual inspection of generating units.
- b. Non-scheduled maintenance of generating units.
- c. Miscellaneous occasional usage of the crane amounts to 4 to 8 days per month.

#### 1.18.3 Contractor's Crane Operator

Qualified Contractor bridge crane operators shall be furnished for the operations. Each crane operator, in addition to meeting the requirements of EM 385-1-1, shall have had at least one year's experience on a counterpart crane of equivalent capacity and characteristics. Qualifications for each operator in the form of an affidavit signed by the operator and the Contractor shall be submitted. The affidavit shall include a complete record of all related work with particular emphasis on experience directly related to operation of a counterpart crane handling comparable loads. Before any operator is approved, they shall spend at least one hour being checked out on the crane under the direct surveillance of the Government. The operator may be retested at any time. The crane operators shall have current (within the previous 12 months) physical or medical examinations with emphasis on hearing, eyesight, and cardiovascular conditions. Dates of the physical exams shall be submitted with the affidavit.

#### 1.18.4 Contractor's Riggers

Qualified riggers shall be furnished for lifting and in attaching such loads to the crane. An affidavit stating the riggers qualifications shall be submitted. The affidavit shall include a complete record of all related experience and be signed by the rigger and the Contractor. The Government shall check riggers for knowledge of hand signals.

#### 1.18.5 Lifting Devices

Any special lifting devices required for the work shall be provided by the Contractor and shall be turned over to the Government upon completion of the contract. All slings used shall be provided new. Slings shall be used for direct in line pulls or loading, and not used for wrapping around a load and lifting that load.

#### 1.19 PLANT AND EQUIPMENT LIST

A complete list of all plant and equipment, exclusive of shop equipment, to be used on the project shall be furnished. An up-to-date plant and equipment list shall be submitted with the end-of-the-month request for payment, throughout the life of the contract. The lists shall include rented equipment as well as lease-purchase or sale-leaseback equipment. The initial list and the revised monthly lists shall indicate dates equipment is assigned to, or removed from, the project, dates dead lined for repairs and returned for use, and adequate identification or description of each item of equipment including manufacturer's name (abbreviated), model number, manufacturer's serial number, year of manufacture, and Contractor's assigned serial or record number.

#### 1.20 CONTRACTOR'S EQUIPMENT AND MATERIAL

##### 1.20.1 General

The planned method of transportation and operation of cranes and other heavy equipment to be used in the performance of this contract shall be submitted. This shall include the type, size, and loadings of equipment and the proposed transportation routes and work areas to be used on the project. Operation of heavy equipment adjacent to existing structures shall be avoided when possible.

##### 1.20.2 Movement of Equipment and Materials by the Contractor

The Contractor shall provide all cranes, rigging, lifts, operators, and other necessary means to move equipment or material as required to pursue and complete the work whether owned by the Government or by the Contractor unless otherwise specifically mentioned. This includes but is not limited to the unloading and loading of equipment and material.

#### 1.21 STORAGE OF EQUIPMENT AND MATERIALS

Indoor and outdoor storage of equipment and materials will be permitted only in designated staging areas noted on the contract drawings and as set forth

in these specifications, unless otherwise approved. All equipment and materials proposed for temporary storage within the Government allocated staging areas shall be approved. A minimum access space of three feet shall be maintained between the Contractor's stored items and the existing powerhouse equipment.

#### 1.22 TOOLS AND MISCELLANEOUS EQUIPMENT

Government tools and equipment in the powerhouse machine shop, i.e., lathes, drill presses, etc., are not available for use.

#### 1.23 DAMAGED EQUIPMENT OR ABNORMAL CONDITIONS

The Government shall be informed immediately upon finding any damaged equipment or other abnormal conditions involving additional work in which the Contractor believes it has no responsibility. The failure or abnormality shall not be disturbed until witnessed. Any damage or abnormal conditions not reported as specified above but discovered at a later date shall also be corrected.

#### 1.24 PROTECTION OF MATERIAL AND WORK

All materials, supplies, tools, equipment, and Government property (including all tools, equipment, and special devices supplied by the Contractor and to be turned over to the Government at the end of the Contract) shall at all times be protected and preserved in an approved manner, and in accordance with manufactures recommendations. If material, equipment, supplies, and work performed are not adequately protected, such property may be protected by the Government and the cost thereof will be charged to the Contractor or deducted from any payment due. Protection of the powerhouse floors and walls shall be provided and maintained by the Contractor. The Contractor shall be responsible for the satisfactory removal of all stains and residues, and the satisfactory repair of damage to structures and equipment. Operating components of existing powerhouse equipment shall be protected by suitable methods as approved.

#### 1.25 CONTRACTOR'S MISCELLANEOUS BUILDINGS

The building of structures, or of the erection of tents or other forms of protection, will be permitted only at such places as approved, and the sanitary conditions of the grounds in or about such structures shall at all times be maintained in a satisfactory manner. Temporary facilities provided during Construction shall be removed as a minimum upon satisfactory completion of the last unit's operational tests. The area shall be left looking "broom clean".

#### 1.26 TEMPORARY FACILITIES

Temporary facilities provided during Construction shall be removed prior to final payment.

## 1.27 PROTECTION AND RESTORATION OF EXISTING FACILITIES

The Contractor shall provide all necessary enclosures and equipment to protect the existing equipment from any adverse environmental conditions (such as dust, dirt, and ambient conditions which may cause condensation on the unit components). The Contractor shall submit the method of protection for approval prior to installation of any enclosures or equipment. All existing facilities shall be protected whether or not shown on the drawings. Upon completion of the work, all the existing facilities, not included as a portion of the work, shall be left in a condition equal to the original condition prior to the contract. Costs for repair and restoration of any facilities shall be considered to be incidental to and included in the contract price.

## 1.28 SCAFFOLDING

Any scaffolding, ladder, stairway, or other access schemes proposed to be used shall be submitted for approval, including type, layout, and connections. Approved anti-slip surface material shall be installed on scaffolding platforms. Scaffolding shall comply in every respect with EM 385-1-1.

## 1.29 DAILY CLEANUP AND DISPOSAL

In conjunction with SECTIONS 01350, and 02081, work areas shall be kept reasonably neat on a daily basis. All debris resulting from the work, such as waste metalwork, packing cases, scrap lumber, oil and grease spills, and other debris shall be collected, removed, and disposed of off-site at least once per week. The location of the Contractor's off-site disposal area and a plan for safe disposal of material shall be submitted for approval. The Government's trash cans, dump boxes, and other containers shall not be used. Liquid waste shall not be disposed of in powerhouse drains. All costs of removing debris shall be incidental to the work, and no separate payment will be made therefore.

## 1.30 DUST CONTROL IN THE POWERHOUSE

### 1.30.1 General

Depending upon the Contractor's plant and equipment and methods of operation, additional provisions for satisfactory dust control will be required and shall be included in the proposed dust control program. Decisions of the Government as to the adequacy and extent of the dust control program and prosecution of the work shall be final. The dust control in the powerhouse shall be considered as incidental to the work and no separate payment will be made therefore.

### 1.30.2 Dust Control Program

All necessary measures shall be taken to effect maximum control of all dust and welding fumes created by operations under this contract. To the maximum

extent possible, all dust and dirt shall be removed by vacuum cleaning, unless otherwise approved. Prior to commencement of such operations, the proposed dust control program shall be submitted. Part of the required dust control program shall include the following:

- a. Provision of exhaust ducts which shall discharge outside the powerhouse structure where mechanical ventilation is used.
- b. Controlled operation of power-driven tools.
- c. Furnishing and removing of oiled sawdust or other approved dust preventatives in areas which cannot be properly rendered free from excessive dusting by vacuum cleaning or other methods.
- d. Vacuum cleaning (or other acceptable method) of spaces within the powerhouse where dust accumulates.
- e. Gasoline or diesel-engine equipment may not be used inside the powerhouse. Air, electrical, propane, or battery-driven equipment may be used inside the powerhouse.
- f. The powerhouse is pressurized to prevent dust infiltration from the outside. All doors will be kept closed when not being used.

#### 1.31 CARE OF DRAINS

Existing powerhouse drains shall not be used for disposal of any solid material (such as blast material) or any liquids other than clear water. The Contractor shall clean drains obstructed by the Contractor. All costs incurred in the cleaning and clearing of plugged drains, shall be borne by the Contractor.

#### 1.32 DISPOSAL OF MATERIALS

Title to all materials and equipment to be disposed of will be vested in the Contractor when beginning disassembly work on that unit, or such materials and equipment that are designated scrap. The Government will not be responsible for the condition, loss, or damage to such property after title transfer. The Contractor may retain these items in usable form and take possession of them providing that there is no subsequent cost or inconvenience to the Government. The Government does not guarantee that these items are complete or in working order, and the Contractor shall assume responsibility for any damages caused by their use immediately upon taking possession of them. Scrap materials shall be removed from the Government's property, within 90 days of removal from each generating unit. Scrap shall not be sold on the site. Disposal of hazardous wastes shall be in accordance with SECTION 02081.

### 1.33 NOISE CONTROL

Noise control and noise levels shall conform to requirements set forth in the appropriate regulations, including OSHA.

### 1.34 FIRE CONTROL

All fire fighting equipment, supplies, and personnel shall be supplied in accordance with EM-385-1-1. Delays due to fire will not be acceptable as the basis of a claim for additional compensation.

### 1.35 PARTS CONTROL

A complete written record shall be maintained of the location and estimated date of return of all parts shipped from the project for repair. This record shall be available for review at all times.

### 1.36 DRAWINGS AND MANUALS

Existing drawings and manuals required for the work will be available for viewing upon request during normal project day shift working hours. Drawings and manuals shall not be removed from the office; however two copies of available technical data and drawings not included in the reference drawings will be made at no cost to the Contractor within five calendar days, excluding weekends, after the request for such copies has been made.

### 1.37 CONTRACTOR'S AGENT, WORK SUPERVISOR, AND PERSONNEL

#### 1.37.1 Contractor's Agent(s)

The Contractor shall give personal attention to the faithful execution and completion of this work and shall be present either in person or by duly authorized representative(s) on the site of the work continually during its progress. The agent shall be fluent in the spoken and written English language. The agent's qualifications and identification shall be provided. The agent shall be fully authorized to act for the Contractor and to receive such orders as may be given for the proper continuance of the work. Written notice to do any work, to alter any work, or to cease work that the Contractor is obligated to do, or concerning any imperfections in work or any material furnished, when given to the agent shall be considered as notice to the Contractor. A daily log shall be made of the accomplished work, and shall be submitted at the completion of the contract. The agent shall have been engaged in similar work at a minimum of two different powerhouses. A verifying contact, with name and phone number, shall be provided for at least two such facilities.

#### 1.37.2 Work Supervisor(s)

At least one (1) full-time employee of the Contractor shall be available at the worksite anytime other Contractor or subcontractor personnel are working on the site to supervise and direct the work specified herein. A supervisor

may also serve in the capacity of Contractor's Agent, if approved by the COR, based on experience and responsibilities, but may not serve in any additional capacities. Supervisor(s) shall be present at the site during erection and shall be responsible for providing complete and correct direction of all rehabilitation work, the initial starting, and all subsequent operation of the equipment until the field tests are completed. The supervisor(s) shall be responsible for following the Government's Safe Clearance Procedures as stated in paragraph SAFE CLEARANCE PROCEDURES, below. The supervisor(s) shall initiate instructions for all actions necessary for the proper inspection, handling, assembly and testing of the equipment. The supervisor(s) shall keep a record of all measurements taken during rehabilitation and shall provide copies on request or on completion of installation of all equipment. The supervisor(s) shall keep all as-built drawings to current standards and provide copies upon completion of the work. The supervisor(s) shall be fluent in the spoken and written English language. The supervisor(s) shall have been engaged in similar work, as is specified herein, for a minimum of 3 years. Documentation of their experience shall be submitted.

#### 1.37.3 Contractor's General Personnel

##### 1.37.3.1 General

The Contractor shall prepare and keep updated, as a minimum weekly, a project organization chart reflecting at least those positions described herein and defining their work relationships, etc. All personnel employed by the Contractor shall be fully qualified in their respective fields to render the services necessary.

##### 1.37.3.2 Identification of Contractor's Employees

The Contractor shall be responsible for furnishing to each employee at the powerhouse and for requiring each employee at the powerhouse to display such identification as approved and specified below. All Contractor personnel, prior to engaging in work on project premises, shall either be issued an identification card by the Contractors or agree to provide their driver's license as identification upon request. If the Contractor so decides to furnish identification cards to all employees, the card must include the following information:

- Name of Contractor
- Name of Employee
- Birth date
- Weight
- Hair color
- Eye color
- Recent photo

All prescribed identifications shall be returned immediately to the Contractor upon release of any employee. The Contractor shall supply a complete listing of all personnel and their titles that will be working on

the project. This listing shall be revised at a minimum of once weekly and revisions provided. When required, the Contractor shall obtain and submit fingerprints of all persons employed by it or to be employed at the powerhouse.

PART 2 PRODUCTS AND PART 3 EXECUTION

(NOT USED)

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SECTION 01090

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PART 3 EXECUTION

(NOT REQUIRED)

## SECTION 01090

## SOURCE OF REFERENCED PUBLICATIONS

## PART 1 GENERAL

## 1.1 STANDARD SPECIFICATIONS

Standard specifications of the following authorities referenced herein may be obtained from the addresses listed below:

NAME	ABBREVIATION
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AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS 444 No. Capitol St., NW, Suite 249 Washington, D.C. 20001 Ph: 800-231-3475 Fax: 800-525-5562 Internet: <a href="http://www.aashto.org">www.aashto.org</a>	AASHTO
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ACI INTERNATIONAL P.O. Box 9094 Farmington Hills, MI 48333 Ph: 248-848-3700 Fax: 248-848-3701 Internet: <a href="http://www.aci-int.org">http://www.aci-int.org</a>	ACI
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AMERICAN NATIONAL STANDARDS INSTITUTE 11 West 42 <sup>nd</sup> Street New York, NY 10036 Ph: 212-642-4900 Fax: 212-398-0023 Internet: <a href="http://www.ansi.org/">www.ansi.org/</a>	ANSI
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**NOTE:** Documents beginning with the letter "S" can be ordered from:  
 Acoustical Society of America  
 P.O. Box 1020  
 Sweickley, PA 15143  
 Ph: 412-741-1979  
 Fax: 412-741-0609  
 Internet: [asa.aip.org](http://asa.aip.org)

AMERICAN SOCIETY FOR TESTING AND MATERIALS 100 Barr Harbor Drive West Conshokocken, PA 19428 Ph: 610-832-9585 Fax: 610-832-9555 Internet: <a href="http://www.astm.org">www.astm.org</a>	ASTM
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01090-1

CODE OF FEDERAL REGULATIONS Order from: Government Printing Office Washington, D.C. Ph: 202-512-1800 Fax: 202-275-7703 Internet: <a href="http://www.gpo.gov">http://www.gpo.gov</a>	CFR
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FEDERAL SPECIFICATIONS  
General Services Administration  
Federal supply Service Bureau  
470 L'Enfant Plaza, S.W.  
Washington, D.C.  
Ph: 202-619-8925  
Fax: 202-619-8978  
Internet: <http://pub.fss.gsa.gov/>

FED SPEC

INSITUTE IF EKECTRICAL AND ELECTRONICS ENGINEERS  
445 Hoes Lane, P.O. Box 1331  
Piscataway, NJ 08855  
Ph: 1-800-701-4333  
Fax: 732-981-9667  
Internet: [www.ieee.org](http://www.ieee.org)

IEEE

NATIONAL ELECTRICAL MANUFACTURERES ASSOCIATION  
1300 No. 17<sup>th</sup> St, Suite 1847  
Rosslyn, VA 22209  
Ph: 703-841-3200  
Fax: 703-841-3300  
Internet: <http://www.nema.org/>

NEMA

NATIONAL FIRE PROTECTION ASSOCIATION  
1 Batterymarch Park  
P.O. Box 9101  
Quincy, MA 02269  
Ph: 617-770-3000  
Fax: 617-770-0700  
Internet: [www.nfpa.org](http://www.nfpa.org)

NEPA

**NOTE:** The complete set of the 1997 National Fire Codes (13 Vol.) is available for \$835.00

THE SOCIETY FOR PROTECTIVE COATINGS  
40 24<sup>th</sup> street, 6<sup>th</sup> Floor  
Pittsburgh, PA 15222  
Ph: 412-281-2331  
Fax: 412-281-9992  
Internet: [www.sspc.org](http://www.sspc.org)

SSPC

**NOTE:** SSPC documents, except as noted otherwise, are available only as a part of the 1995 Steel Structures Painting Manual, 7<sup>th</sup> Edition @ \$115.00

UNDERWRITERS LABORATORIES  
333 Pfingsten Road  
Northbrook, IL 60062  
Ph: 847-272-8800  
Fax: 847-272-8129  
Internet: <http://www.ul.com>

UL

01090-2

U.S. ARMY CORPS OF ENGINEERS  
available from Superintendent of Documents  
U.S. Government Printing Office  
Washington, D.C. 20402

USACE

01090-3

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SECTION 01270

MEASUREMENT AND PAYMENT

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(NOT USED)

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(NOT USED)

## SECTION 01270

## MEASUREMENT AND PAYMENT

## PART 1 GENERAL

## 1.1 GENERAL INFORMATION

In each instance, the contract price for an item will constitute full compensation as herein specified, as shown, or as otherwise approved. The contract price and payment will also constitute full compensation for all work incidental to completion of the item, unless such work is otherwise specifically mentioned for separate payment under another bid item. All items where equipment is to be provided shall include the labor and materials required for installation. In the event any work is required by the specification sections or by the drawings and not specifically mentioned in the measurement and payment paragraphs, separate or direct payment will not be made, and all costs thereof are incidental to, and included in, the contract prices and payment for all items listed in the bid schedule.

## 1.2 MEASUREMENT

## 1.2.1 Lump Sum Items

Items measured as a lump sum will be measured for payment as a complete job in the locations indicated. This measurement includes all incidental work and materials such as fittings, fasteners, electrical materials, and O&M manuals that are necessary to make a complete job. Unless the payment item paragraph makes a specific exception of any item, incidental items will not be measured under any other item even though there is another listing for the work or material.

## 1.2.2 Unit Quantity Items

Items measured as a unit quantity will be measured for payment by the actual quantity of material installed in place to make a complete job.

a. Pound. Miscellaneous welding will be measured for payment as the number of pounds of welding rod or wire placed. When directed to perform welding under this item, the welding rod or wire for the work shall be weighed in the presence of a Government Inspector. Upon completion of the work, the rod studs and unused rods or wire shall be weighed in the presence of a Government Inspector and the difference in weight between the rods or wire issued and the stubs and rods or wire returned will be the amount for payment. If the number of studs plus the unused rods does not equal the number of rods issued, the weight of one rod will be deducted for each rod unaccounted for.

b. Hour. Machinist hire, electrician hire, welding services, painter hire, other skilled craftsman hire, general laborer hire, liquid penetrant method, magnetic particle method, ultrasonic method, and radiographic method

measurement of time will be units of man-hours, with a man-hour defined as one person working as directed for a period of 60 minutes. To qualify as services of miscellaneous hire, the directed work will be additional to that necessary to comply with specifications requirements. Time will be computed by rounding off to the next higher one-half (1/2) hour. No separate measurement for supervision, helper labor, or overhead will be made, as they are incidental to the service being provided.

### 1.3 PAYMENT

#### 1.3.1 General

Payment items for the work of this contract for which contract lump sum payments will be made are listed in the BID SCHEDULE, SECTION 00010, and described in the various sections of these specifications. All costs for items of work which are not specifically mentioned to be included in a particular lump sum or unit price payment item shall be included in the listed lump sum item cost most closely associated with the work involved. The lump sum price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials and equipment, and performing any associated Contractor Quality Control (CQC), environmental protection, meeting safety requirements, tests and reports, and for performing all work required for which separate payment is not otherwise provided.

#### 1.3.2 Site Work, Mechanical Work and Miscellaneous Work

##### Bid Item 0001; Mobilization and Demobilization

Payment for mobilization and demobilization will be made as a lump sum job under Bid Item 0001. Price and payment shall constitute full compensation for:

a. Site mobilization of all materials, equipment and labor necessary to accomplish the work. Mobilization will be considered complete when Government has made area available for the Contractor to commence work.

b. Site demobilization. Demobilization will be considered complete when the Contractor has removed all construction equipment, cleaned the area, and restored the work area to "as-found" pre-contract conditions, unless otherwise approved.

Payment for miscellaneous electrical equipment and accessories will be paid for under Bid Item 0003. Payment shall include miscellaneous electrical equipment and accessories, modifications to main control room switchboard panels and annunciator relay cabinets, in accordance with SECTION 16050.

##### Bid Item 0002 Remove Existing Oil Filled Circuit Breakers, and Isolated-Phase Bus (Units 1-4)

Payment for the removal of the existing oil filled circuit breakers, complete with oil, and isolated-phase bus (Units 1-4) will be made as a lump sum under Bid Item 0002. Payment shall include but not be limited to all labor, equipment, operations and transportation required for the removal and

disposal of the oil filled circuit breakers and isolated-phase bus (Units 1-4) in accordance with all Federal, State and local laws, regulations and ordinances, in accordance with SECTION 16050.

Bid Item 0003 Remove Existing Air Blast Circuit Breakers, Isolated-Phase Bus and Air Compressor(Units 5-8)

Payment for the removal of the existing air blast circuit breakers, isolated-phase bus and air compressor (Units 5-8) will be made as a lump sum under Bid Item 0003. Payment shall include but not be limited to all labor, equipment, operations and transportation required for the removal and disposal of the air blast circuit breakers, isolated-phase bus (Units 1-4) in accordance with all Federal, State and local laws, regulations and ordinances, in accordance with SECTION 16050.

Bid Item 0004 Remove Existing Conduit and Install New Conduit and Cable Tray

Payment for the removal and disposal of existing conduit and installation of new conduit and cable tray will be paid as a lump sum under Bid Item 0004, in accordance with SECTION 16050.

Bid Item 0005 Remove Existing Cable and Install and Terminate New Cable

Payment for the removal and disposal of existing cable and installation and termination of new cable will be paid for as a lump sum under Bid Item 0005, in accordance with SECTION 16050.

Bid Item 0006 Remove Portion of Existing Starting Bus, Two (2) Starting Bus Breakers and four (4) Starting Bus Motor-operated Disconnects

Payment for the removal and disposal of existing starting bus, breakers and motor-operated disconnects will be paid for as a lump sum under Bid Item 0006, in accordance with SECTION 16050.

Bid Item 0007 Install Eight (8) New Government-furnished SF6 Circuit Breakers and Isolated-Phase Bus (Units 1-8)

Payment for the installation of the Government-furnished SF6 circuit breakers and isolated-phase bus will be paid for as a lump sum under Bid Item 0007. Payment shall include all labor, materials, and equipment required to install the SF6 circuit breakers and isolated-phase bus complete and operational, in accordance with SECTION 16050.

Bid Item 0008 Install New Government-furnished Static Start System and Appurtenances, Including Input/Output Circuit Breakers, Transformers, Reactors and Isolated-Phase Bus

Payment for the installation of the Government-furnished static start system and appurtenances, including input/output circuit breakers, transformers, reactors and isolated-phase bus will be paid for as a lump sum under Bid Item 0008. Payment shall include all labor, materials, and equipment required to install the static start system and appurtenances, including input/output and isolated-phase bus complete and operational, in accordance with SECTION 16050.

Bid Item 0009 Miscellaneous Electrical Equipment & Accessories and Modifications to Main Control Room Switchboard Panels and Annunciator Relay Cabinets

Payment for the miscellaneous electrical equipment and accessories and modifications to main control room switchboard panels and annunciator relay cabinets will be paid for as a lump sum under Bid Item 0009. Payment shall include all labor, materials, equipment and operations required to furnish the miscellaneous electrical equipment and accessories not already identified in other bid items and to perform the modifications required to the main control room switchboard panels and annunciator relay cabinets, in accordance with SECTION 16050.

Bid Item 0010 Miscellaneous Painting (Generator Unit Breaker Cabinets, Isolated-Phase Bus, Touch up & Other Miscellaneous)

Painting shall include preparation, painting, and clean up of the equipment, and other miscellaneous items associated with the main circuit breaker installation. Payment will be made under Bid Item No. 0010 " Miscellaneous Painting," as a lump sum, which price and payment shall be full compensation for furnishing all equipment, materials, and labor and for satisfactorily preparing and painting all items specified to receive paint, in accordance with SECTION 09900 and 16050.

Bid Item 0011 Coating Transformer Deck

Coating of the Transformer deck will be paid for as a lump sum job under bid Item 0011. Payment shall include all labor, materials, equipment and operations required to apply coating on the transformer deck for the purpose of waterproofing, including installing flashing at curbs and special treatment for non-moving construction joints as specified and as shown on the drawings, in accordance with SECTION 09980.

Bid Item 0012 Concrete Removal, Placement, Bonding, Drilling, and Grouting

Concrete removal, placement, bonding, drilling, and grouting will be paid for as a lump sum job under bid Item 0012. Payment shall include all labor, materials, equipment and operations required to remove and dispose of concrete for four new bus openings, existing curbs, and support pedestals, for placement of concrete to fill abandoned bus openings, new support pedestals and new curbs and for bonding, drilling and grouting operations required to bond new concrete to existing and to patch and repair as specified and as shown on the drawings, in accordance with SECTION 03307, 03600, and 03730.

Bid Item 0013; Furnish As-Built Corrections to the Contract Drawings.

Payment for Bid Item 0013 will be made as a lump sum job. Price and payment shall include all labor, equipment and materials required to make corrections to the issued contract drawings to show as-built condition upon completion of work, in accordance with SECTION 01780.

Bid Item 0014; Furnish Electrician Hire. (Optional)

Payment for Bid Item 0014 will be made on a per man-hour basis. Man-hours shall be as defined in paragraph 1.2.2 of this Section. Work shall be Contracting Officer Representative (COR) directed in accordance with SECTION 16050.

Bid Item 0015;   Furnish Other Skilled Craftsman Hire. (Optional)

Payment for Bid Item 0015 will be made on a per man-hour basis. Man-hours shall be as defined in paragraph 1.2.2 of this Section. Work shall be Contracting Officer Representative (COR) directed in accordance with SECTION 03307, 03600, 03730, 09900, and 09980.

Bid Item 0016;   Furnish General Labor Hire. (Optional)

Payment for Bid Item 0016 will be made on a per man-hour basis. Man-hours shall be as defined in paragraph 1.2.2 of this Section. Work shall be Contracting Officer Representative (COR) directed in accordance with SECTION 03307, 03600, 03730, 09900, 09980, and 16050.

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SECTION 01330

SUBMITTAL PROCEDURES

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SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUBMITTAL DESCRIPTIONS

The submittals described below are those required and are further described in other sections of the specifications. Submittals required by the CONTRACT CLAUSES and other non-technical parts of the contract are not included in this section.

SD-01 Data

Submittals which provide calculations, descriptions, or documentation regarding the work.

SD-04 Drawings

Submittals which graphically show relationship of various components of the work, schematic diagrams of systems, details of fabrication, layouts of particular elements, connections, and other relational aspects of the work. All drawings shall be submitted in both paper and electronic formats.

SD-06 Instructions

Preprinted material describing installation of a product, system or material, including special notices and material safety data sheets, if any, concerning impedance's, hazards, and safety precautions. Operation and maintenance manuals are considered deliverables under the contract and not submittals; however, when necessary to review information to be included in the final manuals such information to be included in the final manuals should be called for under this submittal description.

SD-07 Schedules

Tabular lists showing location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work.

SD-08 Statements

A document, required of the Contractor, or through the Contractor, from a supplier, installer, manufacturer, or other lower tier Contractor, the purpose of which is to confirm the quality or orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel, qualifications, or other verifications of quality.

SD-09 Reports

Reports of inspections or tests, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used shall be identified and test results shall be recorded.

### SD-13 Certificates

Statement signed by an official authorized to certify on behalf of the manufacturer of a product, system or material, attesting that the product, system or material meets specified requirements. The statement must be dated after the award of this contract, must state the Contractor's name and address, must name the project and location, and must list the specific requirements which are being certified.

### SD-14 Samples

Samples, including both fabricated and unfabricated physical examples of materials, products, and units of work as complete units or as portions of units of work.

### SD-18 Records

Documentation to record compliance with technical or administrative requirements.

## 1.2 REFERENCES

Refer to the Transmittal Form (ENG Form 4025, Attachment 3 located at back of specifications package) or the Submittal Register (ENG Form 4288, Attachment 2) for further information on terms discussed in this section.

## 1.3 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

### a. Government-Approved.

(1) Extension of design which require Government approval such as Contractor's, manufacturer's, or fabricator's drawings; descriptive literature included but not limited to catalog cuts, diagrams; operating charts or curves; critical materials; test cylinders; samples; warranties; deviations; equipment whose compatibility with the entire system must be checked will be listed on the ENG Form 4288. Within the terms of SECTION 00700, Clause SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION, these submittals are also considered to be "shop drawings."

(2) Other items (such as environmental plans, safety plans, Contractor Quality Control (CQC) plans, etc.) designated in the requirements in the technical sections be "submitted for approval" which do not fall under the definitions in paragraph 1.3(a)(1) will not be listed on ENG Form 4288, but will be transmitted as instructed.

b. Information Only. Any submittals on ENG Form 4288 not requiring Government approval (such as certifications and test results, etc.) will be submitted for "information only." See paragraph 3.8 for further information on certificates and test reports. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to at the end of paragraph 1.3(a)(1).

#### 1.4 APPROVED SUBMITTALS

All submittals for Government approval shall be Contractor-approved first and stamped as shown in paragraph 3.7. The approval of submittals by the Government shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing, and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the CQC requirements of this contract is responsible for the dimensions and design of adequate connections, details, and satisfactory construction of all work. After submittals have been Government-approved no resubmittal for the purpose of substituting materials or equipment will be given consideration unless accompanied by an explanation as to why a substitution is necessary.

#### 1.5 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required and promptly furnish a corrected submittal in the form and number of copies as specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, notice as required under SECTION 00700, Clause CHANGES, shall be given promptly to the Government.

#### 1.6 WITHHOLDING OF PAYMENTS

Payments for materials incorporated in the work will not be made if required approvals have not been obtained.

### PART 2 PRODUCTS

(NOT USED)

### PART 3 EXECUTION

#### 3.1 ENG FORMS 4288 AND 4025 (Attachments 2 and 3)

##### 3.1.1 General

All items listed on ENG Form 4288 (Attachment 2) shall be submitted using ENG Form 4025 (Attachment 3). The Government may request submittals in addition to those listed or specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same used in the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control Representative (CQCR), and each respective transmittal item shall be stamped, signed, and dated by the CQCR, as shown in paragraph 3.7, certifying that the accompanying submittal complies with the contract requirements. Proposed deviations from the contract requirements shall be clearly identified as stated in paragraph 3.3.2. Submittals requiring Government approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby.

### 3.1.2 Submittal Register (ENG Form 4288)

See Attachment 2 for one set of ENG Form 4288 listing both "Government-Approved" and "information only" items. Columns "c" through "o" have been completed by the Government. The Contractor shall complete columns "a," "b," and "p" through "u" and return two completed copies for approval within 30 calendar days after Notice to Proceed. The approved submittal register will become the scheduling document and will be used to control submittals to the items described in paragraph 1.3 (a)(1) throughout the life of the contract. The list is not all inclusive and additional submittals may be required by other parts of the contract. This register and the progress schedules shall be coordinated.

### 3.1.3 Transmittal Form (ENG Form 4025)

See Attachment 3 for ENG Form 4025 to be used for submitting both "Government approved" and "information only" submittals listed on ENG Form 4288. These forms will be furnished to the Contractor. Each submission of drawings by the Contractor must be accompanied by Transmittal Form 4025 containing a list of drawings giving titles and numbers. Transmittals containing four of the black and white copies of drawings and a copy of the Transmittal Form 4025 shall be addressed to "District Engineer, U.S. Army Corps of Engineers, Savannah District, ATTN: CESAS-CD-RR, 2167 Engineer Drive, Elbererton, GA 30365. Two black and white copies of drawings and a copy of the Transmittal Form 4025 shall be sent to "U.S. Army Corps of Engineers, Portland District, ATTN: CENWP-HDC-A/Schofield, P.O. Box 2946, Portland, OR 97208-2946". Two black and white copies of drawings and a copy of the Transmittal Form 4025 shall be sent to "U.S. Army Corps of Engineers, Savannah District, ATTN: CESAS-CT-P. P.O. Box 889, 100 W. Oglethorpe Ave, Savannah, GA 31401-0889. Action on these drawings will be in accordance with the instructions on the reverse side of ENG Form 4025. See paragraph 3.5 for Government approval of submittals.

## 3.2 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications in accordance with paragraph 3.8, to be submitted with the pertinent drawings shall be so scheduled.

## 3.3 SUBMITTAL PROCEDURE

### 3.3.1 "Shop Drawing" Procedures

(See paragraph 1.3(a)(1) for definition of "shop drawing.")

#### 3.3.1.1 General

The procedure for "shop drawings" shall be as follows:

a. "Shop Drawings" Approved by Contractor. All "shop drawings" submittals shall be reviewed and corrected to make them complete and in accordance with the contract. Approval shall be indicated on each drawing by an "Approved" stamp as shown in paragraph 3.7. Names and titles of

individuals authorized by the Contractor to approve drawings shall be provided prior to any submission. All shop drawings shall be submitted as indicated herein. Submittals which are not required to be approved by the Government ("information only") will be monitored and spot-checks will be made. When such checks indicate noncompliance, the Contractor will be notified by the same method used for Government approvals.

b. "Shop Drawings" Approved by the Government. Before submission the Contractor shall review and approve all "shop drawings" prepared by subcontractors, suppliers, and the Contractor for completeness and compliance with plans and specifications, and shall so certify by stamp on each drawing or item of printed material. (Red markings are reserved for the Government.) Suppliers or subcontractors certifications are not acceptable as meeting this requirement. Submittals will be reviewed and processed as follows (the following action codes are to further define only the referenced codes on the reverse side of ENG Form 4025):

(1) Action Code A (Approved as Submitted). Shop drawings which can be approved without correction will be stamped "Approved" and one reproducible, or two copies of catalog and other printed data, will be returned to the Contractor.

(2) Action Code B (Approved, Except as Noted, Resubmission Not Required). Shop drawings which have only minor discrepancies will be corrected and stamped "Approved as Corrected" or "Except as Noted." Corrections will be identified. Distribution will be same as for "Approved" drawings.

(3) Action Code C (Approved, Except as Noted, Resubmission Required). Two prints of shop drawings which are incomplete or require more than minor corrections will be marked in red to indicate necessary corrections. One marked copy will be returned to the Contractor stamped "Returned for Correction." Transparencies of such drawings will be destroyed.

(4) Action Code E (Disapproved). One print of shop drawings which are fundamentally in error, cover wrong equipment or construction, or require extensive corrections will be returned to the Contractor stamped "Disapproved." An explanation will be furnished on the print or on ENG Form 4025 indicating reason for disapproval. Transparencies of such drawings will be destroyed.

c. Resubmittal. Resubmittal will not be required for drawings with Action Code A or B unless subsequent changes are made by the Contractor or by a contract modification. For drawings with Action Code C or E, corrections required shall be made, any changes shall be noted by dating the revisions to correspond with the change request date, and the drawings shall be promptly resubmitted for review. Government costs incurred after the first resubmittal will be charged to the Contractor.

### 3.3.1.2 "Shop Drawings" Submittal

#### 3.3.1.2.1 General

ENG Form 4025 shall be in three copies used for transmitting "shop drawings" submittals. Four black and white copies of each drawing shall be submitted for approval. The Contracting Officer will retain three copies of all shop drawings, and one copy will be returned to the Contractor.

#### 3.3.1.2.2 Drawings Format

To maintain the standardization of drawing sizes, and the uniform location of features on drawings, all drawings submitted for approval under this contract shall be nominally 22 inches high by 34 inches wide, (D size or metric A1 size drawings). The title block shall be in the lower right-hand corner, and shall contain the subcontractor's or fabricator's name, contract number, description of item(s), bid item number, verification block to indicate drawing has been reviewed and approved by Contractor, and a revision block. Next to the title block shall be a blank space, approximately 3 inches (8 cm) wide by 2 inches (5 cm) high, for use by the Contracting Officer.

#### 3.3.2 Deviations

For submittals, which include proposed deviations requested, the column "variation" of ENG Form 4025 shall be checked. The reason for any deviations shall be set forth in writing and such deviations annotated on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

#### 3.3.3 Other Submittals

All requirements for "shop drawings" under paragraphs 3.3.1.1 and 3.3.1.2 shall apply to catalog cuts, illustrations, printed specifications, or other data submitted except that five copies for Government approval and three copies for information only shall be submitted. Submittals shall be made on 8 1/2- by 11-inch paper. Inapplicable portions shall be marked out and applicable items such as model numbers, sizes, and accessories shall be indicated. Decisions on these other submittals will be given in accordance with paragraph 3.5.

#### 3.4 CONTROL OF SUBMITTALS

The Contractor's procurement operations shall be carefully controlled to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved ENG Form 4288.

#### 3.5 "GOVERNMENT-APPROVED" SUBMITTALS

Decisions on the submittals will be given by letter. Within 30 calendar days after receipt, one copy will be returned to the Contractor marked "Approved," "Approved, Except as Noted," "Disapproved," or "Returned for Correction." The notations "Approved" and "Approved, Except as Noted" authorize the Contractor to proceed with the work covered by such drawings, subject to the corrections if any, indicated thereon or described in the letter of transmittal. When prints of drawings have been "Returned for Correction," the Contractor shall make the necessary revisions on the drawings and shall resubmit one reproducible and four copies for approval in the same routine as before. Every revision made during the life of the contract shall be shown

by number, date, and subject in a revision block and a notation shall be made in the drawing margin to permit rapid location of the revision. The time consumed by the Contractor in submitting and obtaining approval of assembly and shop drawings shall be included in the time allowed for completion of the contract.

### 3.6 "INFORMATION ONLY" SUBMITTALS

Normally submittals for "information only" will not be returned. Government approval is not required on information only submittals. These submittals will be used for information purposes. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the Contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications and will not prevent the Government from requiring removal and replacement if nonconforming material is incorporated in the work. This does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or check testing by the Government in those instances where the technical specifications so prescribe.

### 3.7 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets the contract requirements shall be "similar" to the following:

CONTRACTOR  
(Firm Name)

\_\_\_\_ Approved

\_\_\_\_ Approved with corrections as noted on submittal data and/or attached sheet(s).

SIGNATURE:

TITLE:

DATE:

### 3.8 CERTIFICATES OF COMPLIANCE

Certificates required for demonstrating proof of compliance of materials with specification requirements shall be executed in the original and two copies. Each certificate shall be signed by an official authorized to certify in behalf of the manufacturing company and shall contain the name and address of the Contractor, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to

which the report applies. Certification shall not be construed as relieving the Contractor from furnishing satisfactory material if, after tests are performed on selected samples, the material is found not to meet the specific requirements.

### 3.9 CONTRACTOR'S FILES

"Approved" and "Approved as Corrected" (Action Codes A and B) drawing files shall be maintained in fabrication shops and at field sites for Government use.

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SECTION 01350

ENVIRONMENTAL PROTECTION

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## SECTION 01350

## ENVIRONMENTAL PROTECTION

## PART 1 GENERAL

## 1.1 GENERAL

This section covers prevention of environmental pollution and damage as the result of construction operations under this contract and for those measures set forth in other Technical Provisions of these specifications. For the purpose of this specification, environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic, cultural and/or historical purposes. The control of environmental pollution and damage requires consideration of air, water, and land resources; and includes management of visual aesthetics; noise; solid, chemical, and liquid waste; radiant energy and radioactive materials; as well as other pollutants.

## 1.2 QUALITY CONTROL

The Contractor shall establish and maintain quality control for environmental protection of all items set forth herein. The Contractor shall record on daily reports any problems in complying with laws, regulations and ordinances and corrective action taken. Copies of these records will be furnished to the Government as directed by the Contracting Officer's Representative.

## 1.3 SUBMITTALS

## 1.3.1 Environmental Protection Plan

SD-08 Statement; GA

The Contractor shall submit an Environmental Protection Plan 20 calendar days after Notice to Proceed in accordance with provisions as herein specified. The Contractor shall meet with representatives of the Contracting Officer's Representative to develop mutual understanding relative to compliance with this provision and administration of the environmental protection program. No physical work at the site shall begin until the Contracting Officer's Representative has approved the above plan(s) or provided specific authorization to start a phase of the work. Preparation and submittal of supplemental plans may be required if additional environmental protection planning is found necessary for later phases of work. Approval of the Contractor's plan will not relieve the Contractor of responsibility for complying with all applicable environmental laws or regulations, for performing adequate and continuing control of pollutants, and for taking other required environmental protection measures. The Government reserves the right to make changes in the above plans and operations as necessary to maintain satisfactory environmental protection performance. The Environmental Protection Plan shall include but not be limited to the following:

(1) Listing of Applicable Laws and Regulations. A list of Federal, State and local laws, regulations, and permits concerning environmental protection, pollution control and abatement that are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations and permits. NOTE: The Contractor shall perform all work in compliance with the provisions of the Contract and applicable Federal, State, and local environmental laws and regulations. Section 1.4 lists those permits and/or certifications obtained by the Corps of Engineers. The Contractor is advised that it is the Contractor's responsibility to obtain all other necessary permits, licenses, and authorizations for a project.

(2) Omitted.

(3) Procedures. Procedures to be implemented to provide the required environmental protection and to comply with the applicable laws and regulations. The Contractor shall set out the procedures to be followed to correct pollution of the environment due to accident, natural causes or failure to follow the procedures set out in accordance with the environmental protection plan.

(4) Permit or license. Permit or license and location of the solid waste and/or hazardous waste disposal areas, and listing of other permits obtained by the Contractor to perform the specified work.

(5) Drawings. Drawings showing locations of any proposed temporary material storage areas, structures and sanitary facilities.

(6) Monitoring. Environmental monitoring plans for the job site, which incorporate land, water, air, and noise monitoring.

(7) Methods of Water Protection. Methods of protecting surface and ground water during construction activities. These waters shall be protected from pollutants such as petroleum products, fuels, oils, lubricants, bentonite, bitumens, calcium chloride, acids, waste washings, sewage, chlorinated solutions, herbicides, insecticides, lime, wet concrete, cement, silt, or organic or other deleterious material. Chemical emulsifiers, dispersants, coagulants, or other cleanup compounds shall not be used without prior written approval from the Contracting Officer's Representative. Waters used to wash equipment shall be disposed of in a manner to prevent their entry into a waterway prior to treatment to an acceptable quality. Fuels, oils, greases, bitumens, chemicals, and other non-biodegradable materials shall be contained with total containment systems and removed from the site.

(8) Noise Control. Noise control plan for the job site. The Contractor shall keep construction activities under surveillance and shall exercise all necessary controls to minimize damage to the environment by noise from equipment and various construction activities. All Contractor's, subcontractor's, and repetitious supplier's equipment used on or in the vicinity of the job site shall be equipped with the best generally available noise suppression devices. The Contracting Officer's Representative must approve equipment not so suppressed and properly maintained for use in writing. Areas that have noise levels greater than 85 dB continuous or 140 dB peak (unweighted) impulse must be designated as noise hazardous areas.

These work areas must have caution signs displayed at the perimeter of the noise area indicating the presence of hazardous noise levels and requiring the use of hearing protection devices.

(9) Work Area. Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. The plan should include measures for marking the limits of use areas.

(10) Contaminant Prevention Statement. Prior to initiating any construction, the Contractor shall prepare a contaminant prevention statement which identifies all potentially hazardous substances on the job site and the intended actions to be taken to prevent the accidental or intentional introduction of such materials into the air, the water or the ground. The Contractor shall also detail special provisions taken to meet Federal, State, and local laws and regulations regarding the storage and handling of these materials. The statement shall also include but not be limited to plans for preventing polluted runoff from plants, equipment parking, and maintenance areas from entering local surface and groundwater sources.

#### 1.3.2 Contaminant Containment and Cleanup Plan.

SD-08 Statement; GA.

The Contractor shall prepare and submit a Contaminant Containment and Cleanup Plan in accordance with specifications detailed in Section paragraph 3.2 below.

#### 1.4 PERMITS OBTAINED BY THE CORPS OF ENGINEERS

No permits have been obtained by the Corps of Engineers to perform the work covered under this contract.

#### 1.5 SUBCONTRACTORS

Compliance with the provisions of this section by subcontractors will be the responsibility of the Contractor.

#### 1.6 NOTIFICATION

The Contracting Officer's Representative will notify the Contractor in writing of any observed noncompliance with Federal, State or local laws, regulations, permits and other elements. The Contractor shall, after receipt of such notice, inform the Contracting Officer's Representative of proposed corrective action and take such action as may be approved. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails or refuses to comply promptly, the Contracting Officer's Representative may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor unless it was later determined that the Contractor was in compliance.

PART 2 PRODUCTS

NOT APPLICABLE

PART 3 EXECUTION

3.1 PROTECTION OF ENVIRONMENTAL RESOURCES

The environmental resources within the project boundaries and those affected outside the limits of permanent work under this contract shall be protected during the entire period of this contract. The Contractor shall confine his activities to areas defined by the drawings and specifications. Furthermore, the Contractor shall perform a preconstruction survey, which includes but is not limited to photographs, and provide this to the Contracting Officer's Representative prior to construction activities. If during construction activities the Contractor becomes aware of the presence of pre-project chemical hazard, all personnel are to leave the work area and the Contractor will immediately report the find to the Contracting Officer's Representative. Environmental protection and replacement shall be as stated in the following subparagraphs:

3.1.1 Omitted.

3.1.2 Disposal of solid wastes

Solid wastes includes any waste excavated or generated by the Contractor which meets the most complete definition of solid waste as described by Federal, State and local laws and regulations. Solid waste excluding hazardous wastes shall be placed in containers which are emptied on a regular schedule. All handling and disposal shall be conducted to prevent spillage and contamination. The Contractor will participate in any State or local recycling programs and reduce the volume of solid waste materials at the source whenever practical.

3.1.2.1 Disposal of solid waste by removal from Government property

The Contractor shall transport all solid waste off Government property and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal.

3.1.3 Omitted

3.1.4 Circuit Breaker Oil

Circuit breaker oil shall be removed and disposed of in accordance with hazardous waste removal and disposal requirements.

3.1.5 Disposal of Hazardous Wastes

Hazardous waste shall be stored, removed from the work area and disposed of in accordance with Federal, State and local laws and regulations. Hazardous waste shall not be dumped onto the ground, into storm sewers or open watercourses, or into the sanitary sewer system. Fueling and lubrication of

equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spills and evaporation. Lubricants, used solvents, waste oil, and other regulated wastes shall be stored in corrosion-resistant containers and disposed of in accordance with Section 02081 HAZARDOUS MATERIALS of this contract.

#### 3.1.6 Protection of Water Resources

The Contractor shall keep construction activities under surveillance, management and control to avoid pollution of surface and ground waters. Discharges of any pollutant into the adjacent watercourses are strictly prohibited, except as otherwise specified or allowed in other sections of the Technical Specifications. Special management techniques as set out below shall be implemented to control water pollution by the listed construction activities, which are included in this contract.

#### 3.1.7 Protection of Air Resources

The Contractor shall keep construction activities under surveillance, management and control to minimize pollution of air resources. All activities, equipment, processes, and work operated or performed by the Contractor in accomplishing the specified construction shall be in strict accordance with all Federal, State and local emission and performance laws and standards. Ambient Air Quality Standards set by the Environmental Protection Agency shall be maintained for those construction operations and activities specified in this section. Dust particles from all construction activities shall be controlled at all times.

##### 3.1.7.1 Hydrocarbons and Carbon Monoxide

Hydrocarbons and carbon monoxide emissions from equipment shall be controlled to Federal and State allowable limits at all times.

##### 3.1.7.2 Odors

Odors shall be controlled at all times for all construction activities, processing and preparation of materials.

##### 3.1.7.3 Monitoring

Monitoring of air quality shall be the responsibility of the Contractor. The Contractor shall monitor all air areas affected by the construction activities.

#### 3.1.8 Burning

Material may not be burned within the contract area at any time within the contract period. In the interest of conservation, the Contractor may, should he desire to do so, make available to the general public without charge, the woody waste material that is cut and stacked. Vegetative debris material may be chipped and used as mulch material for landscaping on Government property, or made available to the public without charge.

### 3.1.9 Inspection

When the Contracting Officer's Representative notifies the Contractor in writing of any observed noncompliance with Federal, State, or local laws, regulation, or permits, the Contractor shall, after receipt of such notice, inform the Contracting Officer's Representative of proposed corrective action and take such action as may be approved. If the Contractor fails to comply promptly, the Contracting Officer's Representative may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions will be granted or costs or damages allowed to the Contractor for any such suspension.

### 3.1.10 Government Performed Environmental Assessment

The Contract specifications have been prepared to comply with the special conditions and mitigation measures addressed in the Environmental Assessment (EA), Environmental Impact Statement (EIS), or other National Environmental Policy Act (NEPA) document for this work. The Contractor is advised that deviations from the drawings, specifications (e.g., disposal areas, staging areas, alternate access routes, etc.) could result in the requirement for the Government to prepare an additional or amended EA pursuant to NEPA. An EA requires a minimum of 90 days for review, processing, and approval time by the Government. Before the Government will commence the environmental assessment, the Contractor must submit all required information necessary to evaluate the alternate proposal as a single and complete package. The Contracting Officer's Representative reserves the right to disapprove the alternate proposal if located in woodlands, wetlands or other sensitive areas.

## 3.2 CLEANUP OF CONTAMINANT RELEASES

The Contractor shall provide the Contracting Officer's Representative a containment and cleanup plan including the procedures, instructions, and reports to be used in the event of an unforeseen oil or hazardous substance release. This plan shall include as a minimum:

- (a) The name of the individual who will be responsible for implementing and supervising the containment and cleanup.
- (b) A list of materials and equipment to be immediately available. Materials and equipment for other cleanup work shall be tailored to the potential hazards involved.
- (c) The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material placement equipment available in case of an unforeseen spill emergency.
- (d) The methods and procedures to be used for expeditious cleanup.
- (e) The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual must immediately notify the Contracting Officer's Representative, in addition to the legally required reporting channels, when a reportable quantity spill of oil or hazardous substance occurs.

### 3.3 POST-CONSTRUCTION CLEAN-UP

The Contractor shall clean up areas used for construction and remove all signs of temporary construction facilities (i.e., work areas, structures, foundations of structures, stockpiles of excess or waste materials); Contractor office, storage and staging areas; and any other vestiges of construction within the project area shall be removed, as directed by the Contracting Officer's Representative.

### 3.4 RESTORATION OF LANDSCAPE DAMAGE

The Contractor shall restore all landscape features damaged or destroyed during construction operations that were not identified for removal. Any vegetation or landscape feature damaged shall be restored as nearly as possible to its original condition. The Contracting Officer's Representative will decide what method of restoration shall be used and whether the damaged vegetation shall be treated and healed or removed and replaced with similar species and dimension, if possible. The restoration work shall be in accordance with a plan submitted for approval by the Contracting Officer's Representative. This work will be accomplished at the Contractor's expense.

### 3.5 MAINTENANCE OF POLLUTION CONTROL FACILITIES

During the life of this contract, the Contractor shall maintain all facilities constructed for pollution control and all portable pollution control devices used under this contract for as long as the operations creating the particular pollutant are being carried out or until the material concerned has been stabilized to the extent that pollution is no longer being created.

### 3.6 TRAINING OF CONTRACTOR PERSONNEL IN POLLUTION CONTROL

Early in the construction period, the Contractor shall conduct a training course for employees and subcontractors that will emphasize environmental protection. Personnel are to be informed of provisions to be taken for hazardous and toxic material container labeling and for managing Material Safety Data Sheets (MSDS). Anticipated hazardous or toxic chemicals shall also be reviewed.

### 3.7 ENVIRONMENTAL LITIGATION

#### 3.7.1 Suspension, Delay or Interruption of Work

If the performance of all or any part of the work is suspended, delayed, or interrupted due to an order of a court of competent jurisdiction as a result of environmental litigation, as defined below, the Contracting Officer's Representative, at the request of the Contractor, shall determine whether the order is due in any part to acts or omissions of the Contractor, or subcontractor at any tier, not required by the terms of the contract. If it is determined that the order is not due in any part to acts or omissions of the Contractor, or a Subcontractor at any tier, other than as required by the terms of this contract, such suspension, delay, or interruption shall be considered as if ordered by the Contracting Officer's Representative in the administration of this contract under the terms of the Contract Clause

"SUSPENSION OF WORK" of this contract. The period of such suspension, delay, or interruption shall be considered reasonable, and an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) as provided in that clause, subject to all the provisions thereof.

### 3.7.2 Definition

The term "environmental litigation", as used herein, means a lawsuit alleging that the work will have an adverse effect on the environment or that the Government has not duly considered, either substantively or procedurally, the effect of the work on the environment.

SECTION 01451

CONSTRUCTION QUALITY MANAGEMENT, CONTRACTOR QUALITY CONTROL

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SECTION 01451

CONSTRUCTION QUALITY MANAGEMENT, CONTRACTOR QUALITY CONTROL

PART 1 - GENERAL

1.1 GENERAL INFORMATION

A Contractor's Quality Control (CQC) system shall be established and maintained in compliance with SECTION 00700, Clause INSPECTION OF CONSTRUCTION. The CQC system shall include but not be limited to plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The CQC system shall cover both on-site and off-site construction operations, and shall be keyed to the proposed construction sequence.

1.2 REFERENCES

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E329	Standard Specification for Agencies Engaged in the Testing
REV B-93	and/or Inspection of Materials Used in Construction.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330. The time of submittal shall be in accordance with SECTION 01330, unless otherwise indicated below.

SD-01 Data

Quality Control Plan; GA

The CQC plan which is proposed to implement the requirements of paragraph 2.1.2, not later than 10 days after receipt of Notice to Proceed. Other submittals shall be as specified elsewhere in the technical sections of DIVISIONS 1 through 16. The CQC organization shall be responsible for certifying that all submittals are in compliance with the contract requirements.

PART 2 - PRODUCTS

2.1 QUALITY CONTROL PLAN

### 2.1.1 General

The plan shall identify personnel, procedures, instructions, tests, records, and forms to be used. The Government will consider an interim plan for the first 30 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

### 2.1.2 The Contractor's Quality Control (CQC) Plan

The CQC plan shall include, as a minimum, the following to cover all construction operations, both on-site and off-site, including work by subcontractors, fabricators, suppliers and purchasing agents:

a. A description of the CQC organization, including a chart showing the lines of authority and acknowledgment that the CQC staff known as Contractor Quality Control Representatives (CQCR's) shall implement the three-phase control system for all aspects of the contract work. The staff shall include a CQC system manager who shall report to the project manager or someone higher in the Contractor's organization. Project manager shall mean the individual with responsibility for the overall management of the project including quality and production.

b. The name, qualifications (in résumé format), duties, responsibilities, and authorities of each person assigned a CQC function.

c. A copy of the letter to the CQC system manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC system manager including authority to stop work which is not in compliance with the contract. The CQC system manager shall issue letters of direction to all other quality control representatives outlining duties, authorities and responsibilities. Copies of these letters shall be furnished to the Government.

d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, off-site fabricators, suppliers and purchasing agents.

e. Control, verification and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test.

f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.

h. Reporting procedures, including proposed reporting formats.

i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks and has separate control requirements. It could be identified by different trades or disciplines, or it could be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable feature under a particular section. This list will be agreed upon during the coordination meeting.

#### 2.1.3 Acceptance of Plan

Acceptance of the CQC plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in the CQC plan and operations including removal of personnel, as necessary, to obtain conformance with contract requirements.

#### 2.1.4 Notification of Changes

After acceptance of the CQC plan, any proposed changes shall be submitted for acceptance a minimum of 7 calendar days prior to implementing any proposed change.

### PART 3 - EXECUTION

#### 3.1 COORDINATION MEETING

After the pre-construction conference and before the start of construction, the Government and the Contractor shall meet to discuss and develop a mutual understanding of the CQC system in detail, and the interrelationship of Contractor's management and control with the Government's quality assurance. Minutes of the meeting which will be prepared by the Government and shall be signed by both the Contractor and the Government, shall become a part of the contract file. There may also be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

#### 3.2 QUALITY CONTROL ORGANIZATION

An individual shall be identified within the Contractor's organization at the site of the work who shall be responsible for the overall management of CQC known as the CQC manager and shall have the authority to act in all CQC matters for the contractor. This CQC system manager will be employed by the Contractor

and shall be on the site at all times during the contract. An alternate for the CQC System Manager will be identified in the plan to serve in the event of the system manager's absence. Period of absence may not exceed 3 weeks at any one time, and not more than 40 workdays during a calendar year. The requirements for the alternate will be the same as for the designated CQC manager. In addition to the above experience and education requirements the CQC System manager shall have completed the course entitled "Construction Quality Management for Contractors." The Government periodically offers this course.

### 3.3 CQC CONTROL

CQC is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. The controls shall be adequate to cover all construction operations, including both on-site and off-site fabrication, and will be keyed to the proposed construction sequence. The controls shall include at least three phases of control to be conducted by the CQC system manager for all definable features of work, as follows:

a. Preparatory Phase. This phase shall be performed prior to beginning work on each definable feature of work and shall include:

- (1) A review of each paragraph of applicable specifications.
- (2) A review of the contract plans.
- (3) A check to assure that all materials and/or equipment have been tested, submitted, and approved.
- (4) A check to assure that required control inspection and testing are provided.
- (5) Examination of the work area to assure that all required previous work has been completed and is in compliance with the contract.
- (6) A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawing or submitted data, and are stored as specified.
- (7) A review of the appropriate activity hazard analysis to assure that safety requirements are met.
- (8) Discussion of procedures for the work features including but not limited to tolerances and workmanship standards for that phase of work.
- (9) A check to ensure that the portion of the plan for the work to be performed has been submitted and accepted.

(10) The Government shall be notified at least 48 hours in advance of beginning any of the required action of the preparatory phase. This phase shall include a meeting conducted by the CQC system manager and attended by the superintendent, other CQC personnel (as applicable), and the individual responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC system manager and attached to the daily CQC report. The applicable workers shall be informed as to the acceptable level of workmanship required in order to meet contract specifications prior to the start of the actual work.

b. Initial Phase. This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

(1) A check of preparatory phase work to ensure that it is in compliance with contract requirements. Review minutes of the preparatory meeting.

(2) Verification of full contract compliance. Verify required control inspection and testing.

(3) Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with sample panels is appropriate.

(4) Resolve all differences.

(5) Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

(6) The Government shall be notified at least 48 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC system manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.

(7) The initial phase should be repeated for each new crew to work on-site, or any time specified quality standards are not being met.

c. Follow-up Phase. Daily checks shall be performed on the ongoing work to assure continuing compliance with contract requirements, including control testing, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon or conceal non-conforming work.

d. Additional Preparatory and Initial Phases. Additional preparatory and initial phases may be conducted on the same definable features of work as determined by the Government if the quality of on-going work is unacceptable;

or if there are changes in the applicable CQC staff or in the on-site production supervision or work crew; or if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

#### 3.4 NOT APPLICABLE

#### 3.5 COMPLETION INSPECTION

At the completion of all work or any increment thereof established by a completion time stated elsewhere in the specifications, the CQC manager shall conduct an inspection of the work and develop a "punch list" of items which are incomplete and/or do not conform to the approved plans and specifications. Such a list shall be included in the CQC documentation, as required by paragraph 3.6, and shall include the estimated date by which the deficiencies will be corrected. The CQC system manager or staff shall make a second inspection jointly with the GQAR to ascertain that all deficiencies have been corrected and submit a record of the inspection to the GQAR. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time stated for completion of the entire work or any particular increment thereof, if the project is divided into increments by separate completion dates.

#### 3.6 DOCUMENTATION

Current records of CQC operations, activities, and tests performed shall be maintained including the work of subcontractors and suppliers. These records shall be on an approved form and shall include factual evidence that required quality control activities and/or tests have been performed including but not limited to the following:

- a. Contractor/subcontractor and their area of responsibility.
- b. Operating plant/equipment with hours worked, idle, or down for repair.
- c. Work performed today, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.
- d. Test and/or control activities performed with results and references to specifications/plan requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.
- e. Material received with statement as to its acceptability and storage.
- f. Identify submittals reviewed, with contract reference, by whom, and action taken.
- g. Off-site surveillance activities, including actions taken.

h. Job safety and environmental protection evaluations stating what was checked, results, and instructions or corrective actions.

i. List instructions given/received and conflicts in plans and/or specifications.

j. Contractor's verification statement.

k. These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 24 hours after the date(s) covered by the report, except that reports need not be submitted for days on which no work is performed. All calendar days shall be accounted for throughout the life of the contract. Reports shall be signed and dated by the CQC system manager. The report from the CQC system manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

### 3.7 NOTIFICATION OF NONCOMPLIANCE

If the Contractor fails or refuses to comply with the contract requirements promptly, the Government may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall make no part of the time lost due to such stop orders the subject of claim for extension of time or for excess costs or damages.

### 3.8 TECHNICAL SPECIFICATIONS SECTION REQUIREMENTS

The various inspections, tests, assurances, reports, etc., called for in the various requirements in the technical sections of DIVISIONS 1 through 16 are in conjunction with this section. The CQC manager or a CQCR staff shall conduct the inspection of all aspects of the various items mentioned in the Technical Specifications for compliance and conduct all required inspections and tests, etc. Inspections and tests shall be recorded in the daily CQC report required in paragraph 3.6.

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SECTION 01780

AS-BUILT DRAWINGS SUBMITTALS

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## SECTION 01780

## AS-BUILT DRAWINGS SUBMITTALS

## PART 1 GENERAL

## 1.1 OMITTED

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with SECTION 01330 SUBMITTAL PROCEDURES:

## SD-02 Shop Drawings

## As-Built Drawings; G

Drawings showing final as-built conditions of the project. The CADD drawings shall consist of two sets of completed final as-built drawings on separate media. One set of media shall be CADD drawing files. The other set of media shall consist of one set of mylars, two sets of blue line prints of the mylars, and the approved marked working as-built prints.

## SD-03 Product Data

## As-Built Record of Equipment and Materials; G

Two copies of the record listing the as-built materials and equipment incorporated into the construction of the project.

## 1.3 PROJECT RECORD DOCUMENTS

## 1.3.1 As-Built Drawings

This paragraph covers as-built drawings complete, as a requirement of the contract. The terms "drawings," "contract drawings," "drawing files," "working as-built drawings" and "final as-built drawings" refer to contract drawings that are revised to be used for final as-built drawings.

## 1.3.1.1 Government Furnished Materials

One set of electronic CADD files in the specified software and format revised to reflect all bid amendments will be provided by the Government at the preconstruction conference for projects requiring CADD file as-built drawings.

## 1.3.1.2 Working As-Built and Final As-Built Drawings

The Contractor shall revise two sets of paper drawings by red-line process to show the as-built conditions during the prosecution of the project. These working as-built marked drawings shall be kept current on a weekly basis and available on the job site at all times. Changes from the contract plans,

which are made in the work, or additional information, which might be uncovered in the course of construction, shall be accurately and neatly recorded as they occur by means of details and notes. Final as-built drawings shall be prepared after the completion of specific phases of work (foundations, structural steel, etc., as appropriate for the project). The working as-built marked prints and final as-built drawings will be jointly reviewed for accuracy and completeness by the Contracting Officer and the Contractor prior to incremental submission of each monthly pay estimate. If the Contractor fails to maintain the working and final as-built drawings as specified herein, the Contracting Officer will deduct from the monthly progress payment an amount representing the estimated cost of maintaining the as-built drawings. This monthly deduction will continue until an agreement can be reached between the Contracting Officer and the Contractor regarding the accuracy and completeness of updated drawings. Noncompliance with regard to maintaining as-built drawings will be consideration for an interim unsatisfactory Contractor performance evaluation. The working and final as-built drawings shall show the following information, but not be limited thereto:

- a. The actual location, kinds and sizes of all sub-surface piling and anchors.
- b. The location and dimensions of any changes within the structure.
- c. Correct grade, elevations, cross section, or alignment of creeks, earthwork, or structures if any changes were made from contract plans.
- d. Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor; including but not limited to fabrication, erection, installation plans and placing details, retaining wall details, riprap sections, etc.
- e. The topography, elevations and grades installed or affected as part of the project construction.
- f. Changes or modifications, which result from the final inspection.
- g. Where contract drawings or specifications present options, only the option selected for construction shall be shown on the final as-built prints.
- h. The Contractor shall furnish a contour map of the final borrow pit/spoil area elevations.
- i. Omitted.
- j. Modifications (change order price shall include the Contractor's cost to change working and final as-built drawings to reflect modifications) and comply with the following procedures.

(1) Directions in the modification for posting descriptive changes shall be followed.

(2) A modification circle shall be placed at the location of each deletion.

(3) For all new details or sections which are added to a drawing, a modification circle shall be placed by the detail or section title.

(4) For minor changes, a modification circle shall be placed by the area changed on the drawing (each location).

(5) For major changes to a drawing, place a modification circle by the title of the affected plan, section, or detail at each location.

(6) For changes to schedules or drawings, a modification circle shall be placed either by the schedule heading or by the change in the schedule.

(7) The modification circle size shall be 1/2 inch diameter unless the area where the circle is to be placed is crowded. Smaller size circle shall be used for crowded areas.

#### 1.3.1.3 Drawing Preparation

The as-built drawings shall be modified as may be necessary to correctly show the features of the project as it has been constructed by bringing the contract set into agreement with approved working as-built prints, adding such additional drawings as may be necessary. At the time of final inspection, 1 copy of the working as-built prints shall be delivered to the Contracting Officer for review and approval. These working as-built marked prints shall be neat, legible and accurate. These drawings are part of the permanent records of this project and shall be returned to the Contracting Officer. The Contractor at no expense to the Government shall satisfactorily replace any drawings damaged or lost by the Contractor.

#### 1.3.1.4 Computer Aided Design and Drafting (CADD) Drawings

Only personnel proficient in the preparation of CADD drawings shall be employed to modify the contract drawings or prepare additional new drawings. Additions and corrections to the contract drawings shall be equal in quality and detail to that of the originals. Line colors, line weights, lettering, layering conventions, and symbols shall be the same as the original line colors, line weights, lettering, layering conventions, and symbols. If additional drawings are required, they shall be prepared using the specified electronic file format applying the same guidance specified for original drawings. The title block and drawing border to be used for any new final as-built drawings shall be identical to that used on the contract drawings. Additions and corrections to the contract drawings shall be accomplished using CADD files. The Contractor will use Microstation Version J software using Windows NT operating system. The electronic files will be supplied on ISO 9660 Format compact disks, read-only memory (CD-ROM). The Contractor shall be responsible for providing all program files and hardware necessary to prepare final as-built drawings. The Contracting Officer will review final as-built drawings for accuracy and the Contractor shall make all required corrections, changes, additions, and deletions.

a. When final revisions have been completed, the cover sheet drawing shall show the wording "RECORD DRAWING AS-BUILT" followed by the name of the Contractor in letters at least 3/16 inch high. All other contract drawings

shall be marked either "AS-Built" drawing denoting no revisions on the sheet or "Revised As-Built" denoting one or more revisions. Original contract drawings shall be dated in the revision block.

b. After receipt by the Contractor of the approved working as-built prints and approval of completed sections of final as-builts the Contractor shall, within 10 days for each specific phase of work for contracts less than \$5 million, or 20 days for each specific phase of work for contracts \$5 million and above, make the final as-built submittal. This submittal shall consist of one ISO 9660 compact disc, read-only memory (CD-ROM), one set of mylars, and two sets of prints of these drawings and the return of the approved marked working as-built prints. They shall be complete in all details and identical in form and function to the contract drawing files supplied by the Government. Any transactions or adjustments necessary to accomplish this are the responsibility of the Contractor. The Government reserves the right to reject any drawing files it deems incompatible with the customer's CADD system. All paper prints, drawing files and storage media submitted will become the property of the Government upon final approval. Failure to submit final as-built drawing files and marked prints as specified shall be cause for withholding any payment due the Contractor under this contract and shall be grounds for a final unsatisfactory Contractor performance evaluation. Approval and acceptance of final as-built drawings shall be accomplished before final payment is made to the Contractor.

1.3.1.5 Omitted

1.3.1.6 Payment

No separate payment will be made for as-built drawings required under this contract, and all costs in connection therewith shall be considered a subsidiary obligation of the Contractor.

## **PART 2 PRODUCTS (NOT USED)**

## **PART 3 EXECUTION (NOT USED)**

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SECTION 02081

HAZARDOUS MATERIALS

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3.1 DISPOSITION OF HAZARDOUS WASTE

SECTION 02081

HAZARDOUS MATERIALS

PART 1 GENERAL

1.1 GENERAL INFORMATION

This Section covers general requirements and regulations for hazardous materials relating to site operations under this contract. The specific requirements of SECTION 01350 shall be in conjunction with this section in addition to other sections which may contain hazardous material requirements.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

CODE OF FEDERAL REGULATIONS (CFR)

40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Generators of Hazardous Waste
40 CFR 263	Transporters of Hazardous Waste
40 CFR 264	Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
49 CFR 178	Shipping Container Specification

U.S. ARMY CORPS OF ENGINEERS PUBLICATIONS (USACE)

USACE EM 385-1-1 (1996) Safety and Health Requirements Manual

1.3 SUBMITTALS

Submittals required by this section of the Technical Specifications shall be for Government approval (GA) or for information only (FIO), and shall be submitted as stated below in accordance with SECTION 01330

SD-01 Data

Hazardous Waste Determinations; GA

Hazardous waste determinations, sample plans, sample results, disposal plans, disposal restrictions and shipping manifests, prior to shipment of any hazardous waste off site.

Shipping Manifest; FIO

Shipping manifest, signed by an authorized representative of the disposal facility, within 30 days after shipment from the Project, showing that the hazardous waste was accepted at the approved disposal facility.

Safe Storage Plan; GA

As part of the hazardous communication program a plan for safe storage of hazardous waste shall be submitted, as specified in para 3.1.3.

#### 1.4 DEFINITIONS

##### 1.4.1 Hazardous Materials

For the purpose of this contract a material will be considered hazardous if that material has any of the following characteristics: ignitability, corrosivity, reactivity, or toxicity in accordance with 40 CFR part 261, subpart C, "Characteristics of Hazardous Wastes.

#### PART 2 PRODUCTS (NOT USED)

#### PART 3 EXECUTION

##### 3.1 DISPOSITION OF HAZARDOUS WASTE

###### 3.1.1 Hazardous Waste Generated by the Contractor

All hazardous waste generated by the Contractor shall become the property and responsibility of the Contractor. All hazardous waste disposal shall be in accordance with applicable Federal, State and Local regulations. The Contractor is required to provide all labor, equipment, materials and documentation for analysis, sampling, transportation and disposal of all hazardous waste streams, in accordance with 40 CFR part 260 through 272, generated during this contract. Hazardous waste shall not be allowed to accumulate on site for more than 90 days.

###### 3.1.2 Other Hazardous Materials

If the Contractor discovers, or comes into contact with hazardous materials other than those identified in these specifications, the Contractor shall immediately notify the Government, and the Government will make a determination as to the course of action.

###### 3.1.3 Hazardous Communication Program

A hazardous communication program shall be implemented, and Material Safety Data Sheets shall be used in accordance with EM 385-1-1 para. 01.B.04. Prior to bringing any hazardous material or material that will generate a hazardous waste in excess of the reportable quantity as defined by Federal, State or Local laws, it shall be the Contractor's responsibility to inform the Contracting Officers Representative in writing and submit for approval all plans for safe storage, labeling, use of emergency procedures and disposal.

CONCRETE REMOVAL

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- 3.1 METHOD

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SECTION 03600

CONCRETE REMOVAL

PART 1 GENERAL

1.1 GENERAL INFORMATION

1.1.1 Work Description

The work covered by this section consists of furnishing all material, labor, and equipment, and performing all work for:

a. Removing concrete for four new bus openings in the reinforced concrete Service Deck. The deck is approximately 20" thick and opening dimensions are 2'8" by 8'0".

b. Cutting Service Deck concrete to form a 10" deep by 3" ledge around the perimeter of the four existing openings. These openings are approximately 3'0" by 8'0" and are to be filled with shrinkage-compensating concrete (See SECTION 03307). The ledge is to provide shear strength to the interface between existing and new concrete.

c. Removing and disposing of existing curbs around four existing circuit breakers.

d. Removing and disposing of from 50 to 74 (depending on how many can be reused) existing concrete support pedestals. These pedestals are approximately 24" by 24", are from 2" to 7" high, and have 4 anchor bolts anchoring them to the concrete deck.

1.1.2 Coordination With Other Work

The concrete removal operation shall be coordinated to avoid interferences with other work. See SECTION 01010.

1.1.3 Construction Access

Access to staging areas shall be as approved by the Contracting Officer.

1.1.4 Disposal And Clean-Up

Disposal of concrete cutting debris and associated items shall be as described in SECTION 01010. Clean-up of concrete cutting work areas shall be required to remove all debris such that unaffected areas are returned to original condition.

1.2 NOT APPLICABLE

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330.

SD-04 Drawings

Drawings indicating locations and magnitudes of deck loads intended to be applied by the Contractor, 30 days prior to the concrete removal operation; GA

Drawings showing means of supporting the concrete during the removal operation, 30 days prior to the concrete removal operation; GA

SD-08 Statements

Concrete Removal Plan; GA

A written plan for concrete removal and disposal, including equipment to be used, expected noise levels and duration, 30 days prior to the concrete removal operation.

PART 2 - PRODUCTS

2.1 GENERAL

The materials and products shall be the standard products that are regularly utilized to perform the concrete removal, cutting and drilling operations as specified herein and as indicated on the contract drawings.

PART 3 - EXECUTION

3.1 METHOD

3.1.1 General

a. Concrete shall be removed in a manner that will not fracture the surrounding concrete or damage reinforcement to remain. Explosive demolition will not be allowed. Adequate equipment shall be provided to remove the pieces of concrete safely and without damage to the surrounding structure. Slurry or tailings generated from drilling or sawing operations shall be confined to the immediate area, and disposed of by vacuuming or washing. Additional dust control measures shall be implemented as per SECTION 01010 of these specifications All concrete removed shall be disposed of at a location directed by the Contracting Officer.

b. Saw cutting and wire cutting are the recommended methods for the work to be done as part of this contract. When the portion of concrete to be removed is of such a magnitude that it cannot be extracted in a single piece, additional cutting may be performed to allow the concrete to be removed in convenient sized sections. Drilling and chipping may be employed in small areas to complete the removal to the lines shown on the drawings. When required, concrete removed by saw cutting or wire cutting shall be brought to the final required lines and grades by using lightweight chipping hammers, bush hammers, grinding or other approved means. Shear keys need not be completed to the corners shown on the drawings, but the keys should be complete to within 6 inches of the corners.

### 3.1.2 Concrete Surface Preparation

See SECTION 03730.

### 3.1.3 Exposed Reinforcement

See the Drawings.

### 3.1.4 Existing Concrete Strength

The existing concrete may in strength from about 3000 to over 6000 psi. The nominal aggregate size of the concrete is unknown. Zones of honeycomb concrete may also be encountered.

### 3.1.5 Existing Embedded Items

Reinforcing steel will be encountered. Minor embedded steel at various distances from the concrete faces, steel anchors and form tie backs used in placement of the existing concrete may be encountered. The number and kind are unknown.

### 3.1.6 Quality Control

A quality control system for the concrete cutting operation shall be established and maintained.

### 3.1.7 Disposal Of Waste Water And Concrete Debris

The method used in disposing of waste water employed in cutting, washing, and rinsing of concrete surfaces shall be such that it does not stain, discolor, or affect exposed surfaces of the concrete and is not allowed to enter the gallery below the deck. The method for disposing of concrete debris and wastewater shall be as per the written concrete removal plan and shall be prepared in accordance with SECTION 3600.

### 3.1.8 Repair Of Concrete Surfaces

Restoration of the concrete surfaces to the required lines and grades shown and shall be as specified by this section and SECTION 03307.

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SECTION 03730

RESIN SYSTEMS FOR CONCRETE BONDING; DRILLING AND GROUTING  
REINFORCING STEEL

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SECTION 03730

RESIN SYSTEMS FOR CONCRETE BONDING; DRILLING AND GROUTING  
REINFORCING STEEL

PART 1 GENERAL

1.1 GENERAL INFORMATION

a. This specification covers the bonding of plastic Portland cement concrete overlays to hardened concrete using an epoxy system as a bonding agent. Also covered in this specification is the drilling and grouting of reinforcing bars using a resin grout system or a Portland cement type of non-shrink grout. Concrete repair work using a Portland cement type damp-pack mortar (often referred to as dry packing), is covered in SECTION 03307.

b. The work shall be in accordance with ACI 318 part entitled Construction Requirements, ACI 503.2, Standard Specification for Bonding Plastic Concrete to Hardened Concrete with a Multi-Component Epoxy Adhesive. Epoxy resin shall conform to ASTM C 881, except as modified hereinafter.

1.2 REFERENCED PUBLICATIONS

The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

ACI INTERNATIONAL (ACI)

ACI 503.2 (1992; R 1997) Standard Specification for Bonding Plastic Concrete to Hardened Concrete with a Multi-Component Epoxy Adhesive

ACI 318/318R (1999) Building Code Requirements for Reinforced Concrete

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO T 237 (1973) Standard Method of Testing Epoxy Resin Adhesive

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 881 (1999) Epoxy-Resin-Base Bonding Systems for Concrete

ASTM C 1107 (1991a) Packaged Dry, Hydraulic-Cement Grout (Non-shrink)

ASTM D 638 (1998) Test Method for Tensile Properties of Plastics

ASTM D 648 Rev C (1998) Test Method for Deflection Temperature of Plastics Under Flexural Load

ASTM D 695 (1996) Test Method for Compressive Properties of Rigid Plastics

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (1996) Safety and Health Requirements Manual

1.3 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330.

SD-01 Data

Non-shrink Grout; FIO

Descriptive literature of the pre-packaged dry, non-shrink hydraulic-cement grout proposed for use in grouting of reinforcing bars stating that it is suitable for the application or exposure for which it is being considered, 30 days prior to the grouting operations.

SD-06 Instructions

Application Control; FIO

Mixing and application procedures and manufacturer's safety instructions, 30 days prior to the work.

SD-08 Statements:

Two-Component Resin Grout for Grouting Reinforcing Bars; FIO

Descriptive literature and a certificate from the manufacturer stating that the material is suitable for the application for which it is to be used and that the full specified yield strength of the reinforcing steel is developed by the material placed in a drill hole of length equal to the embedment length as required by ACI-318, 30 days prior to the grouting operation.

Environmental Control; FIO

The manufacturer's recommendations as to the environmental conditions under which the resin compounds may be used, and the proposed method of temperature, humidity, and ventilation control procedures, 30 days prior to the work.

Handling of Materials; FIO

The manufacturer's recommendations for handling, storage and worker safety equipment and procedures, 30 days prior to delivery of the material to the project site.

SD-13 Certificates

Certificates of Compliance; FIO

Manufacturer's certificates of compliance attesting that epoxy resin system, latex admixture, polymer modified cement, and non-shrink grout meet the requirements specified, 30 days prior to the work.

#### 1.4 MATERIAL STORAGE

Epoxy and other resin materials shall be stored in accordance with manufacturer's recommendations. Other materials shall be stored in such a manner as to avoid contamination and deterioration. Resin containers shall be clearly labeled with the following information:

- a. Name of Manufacturer.
- b. Manufacturer's product identification.
- c. Manufacturer's instructions for mixing.
- d. Warning for handling and toxicity.
- e. Manufacturing date and shelf life.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

Materials shall conform to the requirements specified below:

a. Epoxy Bonding Resin. Epoxy bonding resin shall be a two-component, solventless, non-shrink, 100 percent solids, moisture insensitive, bonding agent suitable for bonding epoxy mortars and Portland cement concrete to Portland cement concrete or steel substrates and shall conform to Type II, Grades 1 or 2, Class A, B, or C as defined in ASTM C 881 with class selected as determined by ambient and concrete surface temperature at the location of application and approved by the Contracting Officer. The epoxy resin shall have a minimum compressive strength of 5,000 psi as determined by ASTM D 695, a minimum tensile strength of 4,000 psi as determined by ASTM D 638, a minimum slant shear strength of 5,000 psi as determined by AASHTO T 237, and a minimum heat deflection temperature of 127°F as determined by ASTM D 648. Epoxy bonding resin shall be concrete gray in color.

b. Curing Materials. Curing conditions including use of curing material shall be in accordance with the resin manufacturer's recommendations.

c. Two-Component Resin for Grouting Reinforcing Bars. Grout may be a two-component material consisting of an epoxy, polyester, or vinylester resin and a hardener conforming to ASTM C 881. The mixing of the resin and hardener shall be according to the manufacturer's recommendations. Grout components pre-packed into capsules or cartridges with resin and hardener separated by membrane or seal will be allowed. The mixing of the resin and hardener and the grouting procedure shall be according to the manufacturer's recommendations.

d. Non-shrink Grout for Grouting Reinforcing Bars. Non-shrink grout to be used for grouting reinforcing steel in lieu of two-component resin systems shall be a commercially available prepackaged material. The use of metallic

iron in the grout will not be acceptable. Pre-packaged non-shrink grout may be either a gas-liberating or expansive-cement type of material needing only the addition of water and consisting of a commercial formulation suitable for the application proposed and meeting all requirements of ASTM C 1107.

### PART 3 - EXECUTION

#### 3.1 BONDING OF CONCRETE TO EXISTING CONCRETE

Concrete surfaces against which new concrete is to be placed shall be roughened to a  $\frac{1}{4}$ " amplitude and sandblasted as necessary to remove all deleterious materials such as laitance, dust, dirt or oil. The epoxy compounds to be used as a bonding agent shall be mixed and applied, and the fresh plastic concrete placed in accordance with ACI 503.2.

#### 3.2 DRILLING AND GROUTING REINFORCING STEEL

##### 3.2.1 Drilling

Holes are to be drilled into existing concrete for the installation of reinforcing bars. The equipment and methods employed shall be capable of performing these operations, as well as drilling through miscellaneous tramp metal and reinforcing steel that may be encountered, without damaging surrounding concrete. Tailings and slurry resulting from the drilling operation shall be confined to the immediate area and removed from the site. Dust control measures shall be implemented as per SECTION 01010. Holes shall be flushed with clean water to remove residue, then blown out using oil-free compressed air, and allowed to dry.

##### 3.2.2 Grouting

Reinforcing bars may be grouted in place with either a two-component resin system in accordance with the manufacturer's instructions as specified in paragraph 2.1.(3), or with a prepackaged non-shrink grout as specified in paragraph 2.1.(4). Run-out of any grout materials during the grouting operation shall be confined to the immediate area and removed from the site.

#### 3.3 CURING AND PROTECTION

Minimum temperatures for resin mortar and grouts, and epoxy bonding systems shall be in accordance with the manufacturer's recommendations.

#### 3.4 CLEAN UP

Resin mortar spillage shall be cleaned from the surface immediately. Leakage of mortar around the edge of the form during placing shall be plugged immediately and the leakage area repaired.

#### 3.5 SAFETY

Resins and cleaning solvents may be skin irritants. Section No. 6 of EM 385-1-1 "Safety and Health Requirements Manual" shall be strictly adhered to and workmen shall be equipped with eye and skin protection. The manufacturer's recommended safety equipment and instructions shall be used. Ventilation

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shall be provided in areas where mixing and placing of mortar will accomplished and other project areas where fumes concentration may occur. The Contractor shall provide respirators to all personnel required to enter work areas when in the opinion of the Contracting Officer such equipment is necessary for personal safety due to inadequate ventilation.

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SECTION 09900

PAINTING

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## SECTION 09900

## PAINTING

## PART 1 GENERAL

## 1.1 GENERAL INFORMATION

This section covers all operations in connection with the preparation of surfaces and application of paint and other specified materials.

## 1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

## FEDERAL SPECIFICATIONS (FED SPEC)

FS TT-E-489A	Enamel, Alkyd, Gloss (for Exterior Interior Surfaces.
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## STEEL STRUCTURES PAINTING COUNCIL (SSPC)

SSPC-SP 3	(1989) Power Tool Cleaning
SSPC-SP 7	(1989) Brush-Off Blast Cleaning
SSPC-Paint 25	(1982) Red Iron Oxide, Zinc Oxide, Raw Linseed Oil and Alkyd Primer

## 1.3 SUBMITTALS

Submittals required by this section of the Technical Specifications shall be for Government approval (GA) or for information only (FIO), and shall be submitted as stated below in accordance with SECTION 01300.

## SD-01 Data

Paint Sample; GA

Upon notification by the Contractor that the material is at the site or source of supply, a 1-quart sample of each batch, except for small quantities approved as proprietary brands, shall be taken by random selection from the sealed containers by the Contractor in the presence of a representative of the Contracting Officer. The contents of the sampled containers shall be thoroughly mixed to ensure that the sample is representative. Designated name, specification number, batch number, project contract number, intended use, shall identify samples and quantity involved.

## SD-14 Samples

Small Quantity Paint Substitution; GA

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The Contractor shall submit for approval the names; quantity represented, and intended use for the proprietary brands of materials proposed to be substituted for the specified materials when the required quantity of a particular color is 50 gallons or less.

## PART 2 PRODUCTS

## 2.1 PAINTS TO BE APPLIED -- NUMBER OF COATS AND FORMULAS

New material, new equipment, existing metal work and existing equipment at the site requiring touch up painting shall be painted with system No. 16. Paint shall be brush or roller applied to match existing color of part or the nearest wall. Spray painting will not be permitted. The method of surface preparation shown in the tabulation of paint systems is for identification purposes only. Cleaning of surfaces prior to painting shall be accomplished in accordance with detailed requirements of paragraph 3.2.

System No. 16

Surface Preparation	<u>Paint Formulas to be Applied</u>		
	1st Coat	2nd Coat	3rd Coat
Power tool or Brush-off Blast Cleaning	SSPC Paint 25	Fed. Spec. TT-E-489 (Class A)	Fed. Spec. TT-E-489 (Class A)

Surfaces shall be coated with the system indicated. The first coat shall be brush or roller applied at a spreading rate not to exceed 500 square feet per gallon and touched up as required to maintain its integrity at all times. The second and third coats of the system shall be brush or roller applied at a minimum spreading rate of 450 square feet per gallon.

## PART 3 EXECUTION

## 3.1 SAFETY PROVISIONS

Current Federal and State, whichever is applicable, OSHA safety provision for painting shall be followed. For any touch up painting on the project site, all OSHA safety standards plus applicable portions of referenced EM 385-1-1 shall be followed. All Federal, State, and Local laws, especially concerning environmental protection (pollution) shall be followed during surface preparation and painting.

## 3.2 CLEANING AND PREPARATION OF SURFACES

## 3.2.1 Cleaning

After fabrication, all structural steel and unfinished surfaces of castings shall be thoroughly cleaned of all loose mill or foundry scale, weld spatter and of all rust, dirt, oil, grease, and other foreign substances. Oil and grease shall be removed by wiping with suitable solvents. After solvent cleaning, the surfaces shall be cleaned by means of power tools conforming to

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the requirements of SSPC-SP 3 or by dry blasting to the brush-off grade conforming to SSPS-SP 7. Nonferrous metals, corrosion resisting steel and surfaces in sliding or rubbing contact shall not be painted. Ferrous machine-finished surfaces that do not require painting and surfaces in bolted contact shall be protected. Machinery units shall be shop finished in accordance with the manufacturer's standard practice. Electrical equipment shall be touched-up or painted if required due to damage during the course of work or as otherwise determined necessary. Dry blasting if not permitted at the powerhouse.

## 3.2.2 Protection of Surfaces During Cleaning and Painting

Mask and protect items and materials such as machinery, name plates, identification labels, bearings, and shafting which would have their function and appearance degraded by paint to keep them free of paint. Should any paint be applied to such items, immediately and carefully remove it. Carefully protect items and materials that would be damaged by abrasive blasting and other surface preparation techniques, not only from direct blasting damage, but also from grit and dust associated with the process. Care shall be taken to avoid contamination of adjoining spaces, machinery, and equipment. Any material or equipment damaged by grit blasting shall be repaired or replaced.

### 3.2.3 Painting

Paint shall be applied only on surfaces that are thoroughly dry. All joints and crevices shall be filled where necessary and thoroughly coated. The temperature of the surface to be painted and the atmosphere shall be maintained at or above 50° F. Materials painted under cover in damp or cool weather shall remain under cover until dry. Surfaces that do not require painting shall be masked or protected by other means during the painting of adjacent work. The material shall not be loaded for shipment until the paint is thoroughly dry. Painting materials shall not be laid on the ground. Care shall be used in handling painted material to avoid scraping or breaking the painted surfaces. Erection and field assembly marks shall be made on the painted surfaces. The finished coating shall be free from holidays, pinholes, bubbles, runs, drops, ridges, waves, laps, unnecessary brush marks, and variation in color, texture, and gloss. All paint coats shall be applied in such manner as to produce a continuous film of uniform thickness.

### 3.3 DAMAGE PREVENTION

Welding on or in the vicinity of previously painted surfaces shall be conducted in a manner as to prevent weld spatter from striking the paint and to otherwise reduce coating damage to a minimum. Paint damaged by welding or other operations shall be restored to its original condition. The coating shall be completely cured prior to attaching slings or other handling devices.

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### 3.4 TOUCH-UP PAINTING

Damage areas of the shop coatings due to handling, transporting, erection, or other causes shall be touch up painted in the field. Touch-up painting shall conform with the same requirements as shop painting. Touch up painting shall be performed so that the paint finish and color matches surrounding surfaces or that the whole surface is repainted.

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SECTION 09980

TRANSFORMER DECK COATING

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SECTION 09980

TRANSFORMER DECK COATING

PART 1 GENERAL

1.1 GENERAL INFORMATION

The work covered by this section consists supplying all labor and materials required for furnishing and installing a liquid-applied urethane traffic deck coating on the transformer deck for the purpose of waterproofing. The work includes installing flashing at curbs and special treatment for non-moving construction joints. It is to match the existing membrane in appearance and quality. The work includes:

- a. Sealing new curbs at the four new bus openings in the deck.
- b. Sealing surfaces of concrete where existing concrete pedestals, curbs, and circuit breaker supports are removed.
- c. Sealing surfaces of new concrete to fill abandoned bus openings and to seal the joint between existing and new concrete.
- d. Sealing the surfaces of new grout used to fill abandoned drain pipes, compressed air pipes, and other existing penetrations

1.1 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

1.2 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330.

SD-01 Data

Deck Coating; GA

Manufacturer's literature demonstrating compliance with applicable specifications for the material and related items.

SD-08 Statements

Coating Placement; FIO

Manufacturer's acceptance of the methods and equipment for transporting, handling, and installing the deck coating, including flashing and sealing non-moving joint.

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Coating Placement: GA

Manufacturer's acceptance of the qualifications of the Applicator.

1.3 STORAGE OF MATERIALS

All materials shall be stored in their original, sealed containers or unopened packages, and shall be clearly labeled with the manufacturer's name, brand name and number, and the batch number of the material if appropriate. Materials shall be stored in a neat and safe manner so as not to exceed the allowable live load of the storage area. Materials shall be stored out of the weather in a clean, dry area at a temperature range recommended by the manufacturer. Liquid materials such as adhesives, thinners and primers, and any flammable materials shall be stored in areas away from sparks, flames, and excessive heat.

#### 1.4 WORKMANSHIP AND APPLICATIONS

Work shall be performed by a qualified applicator approved by the manufacturer. All material shall be mixed, thinned, modified and applied only as directed by the manufacturer. The Contractor shall protect the work and the work area, and adjacent areas and materials by suitable covering, barricades, signs or other methods. The sealing materials and procedures for the joints between existing concrete and new concrete fill shall be as recommended by the manufacturer for "non-moving cracks".

### PART 2 - PRODUCTS

#### 2.1 MATERIAL

##### 2.1.1 Deck Coating System

The deck coating system shall be a urethane rubber coating, with salient features equal to those of the urethane rubber coating as manufactured by Gaco Western Inc., P.O. Box 646, Waukesha WI 53187-0646. The deck coating system shall include flashing and all materials necessary for the treatment of construction joints between old and new concrete. The existing deck coating consists of the materials described herein. The material of the new deck coating is required to bond with and match the existing coating in appearance and serviceability.

##### 2.1.2 Color

The color of the finish coat shall match that of the existing deck. The contract specification for the existing deck coating states that the finish coat is "'oyster' (off-white)". It is the responsibility of the contractor to verify the color and match the existing.

### PART 3 - EXECUTION

#### 3.1 GENERAL

The Contractor shall furnish all competent supervision, experienced labor, materials, tools and equipment required to complete in an acceptable manner

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the liquid-applied deck coating in accordance with the latest instructions provided by the manufacturer. The existing slope-to-drains is to be maintained. Polymer-modified, silica fume enhanced mortar shall be used to repair areas less than ¼ inch deep.

#### 3.2 PREPARATION

##### 3.2.1 Inspection Of Deck And Flashing Surfaces

The Contractor shall examine all surfaces designated to receive the system. The Contractor shall repair unacceptable surfaces. Surfaces shall be free of contaminants such as, but not limited to, asphalt, oil, paint, grease, scale, cement laitances, curing compounds and similar materials. Concrete surfaces

having an abundance of cement laitance or scale shall be sandblasted or ground. If grinding is employed, acid etching, thorough water flushing, and drying shall follow it.

### 3.2.2 Application, Weather And Temperature Conditions

The traffic deck coating shall not be applied over new concrete until the concrete has cured for a minimum of 28 days. No application of coating shall be accomplished during inclement weather or when inclement weather is imminent. The temperature of the substrate shall be within the limits specified by the manufacturer. Prior to and during application, all dirt and dust shall be completely removed by vacuuming, sweeping, blowing with compressed air, or similar methods. Surfaces not to receive the coating shall be masked or otherwise protected against spillage or accidental application

### 3.2.3 Representative Sample

Prior to the accomplishment of the work, the Contractor shall demonstrate the procedure on a small area. The demonstration shall include treatment of surfaces, connection to existing sealant, flashing at curbs, and the treatment of a non-moving crack.

### 3.2.4 Protection And Cleanup

#### 3.2.4.1 Protection

Protection shall be maintained to exclude traffic of all types for a period of time recommended by the manufacturer.

#### 3.2.4.2 Cleanup

The Contractor shall remove all masking, equipment, containers, materials and debris from the work and storage areas and leave those areas in an undamaged and acceptable condition.

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## SECTION 16050

### ELECTRICAL EQUIPMENT AND WORK FURNISHED BY THE CONTRACTOR

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## SECTION 16050

ELECTRICAL EQUIPMENT AND WORK  
FURNISHED BY THE CONTRACTOR

## PART 1 GENERAL

## 1.1 GENERAL INFORMATION

This Section specifies the electrical equipment and work required to connect and complete the replacement of the existing main unit circuit breakers and installation of the static start system. The Richard B. Russell Powerhouse contains four 4000 ampere oil circuit breakers and four 5000 ampere air blast circuit breakers, one for each of the 13.8 kV main unit generators. The Contractor shall furnish all labor, equipment and materials to perform the work. Work includes, but is not limited to: removal of the eight (8) main unit circuit breakers, disconnects, control equipment and enclosures; removal of control cables to the Generator Actuator cabinets and Excitation cubicles in the Generator Bays and Switchgear Rooms and to the Main Control Panels in the Powerhouse Control Room; partial removal of isolated-phase bus and supports; removal of four (4) motor-operated disconnect switches and modifications to the enclosures; removal of the air compressor; removal of the starting bus circuit breakers and a portion of the starting bus; installation of eight (8) Government-furnished SF6 circuit breakers, control cabinets and isolated-phase bus and supports under the direction of the breaker manufacturer's erecting engineer, including cable; installation of the Government-furnished static start system, including static frequency controller (SFC), input and output circuit breakers and transformers, current-limiting reactors, and isolated-phase bus under the direction of the static start manufacturer's erecting engineers; conduits; medium voltage cables and control cables and terminations; and the miscellaneous electrical accessories defined herein.

The contract drawings are based on drawings prepared for the procurement of Government-furnished equipment and will be superseded by manufacturers shop drawings when available. The drawings are not intended to dictate the actual design but only to indicate:

- a. the limitations of space in which each new apparatus and equipment structure is to be installed.
- b. the desired arrangement and functions of the new connections and associated equipment to the new Government-furnished circuit breakers.
- c. the nominal dimensions for the powerhouse structure and pertinent features and of the existing equipment installations with their general details as associated with this work.

The Contractor shall field verify all existing dimensions, details, and features relevant to requirements for equipment, apparatus, and support structure design, manufacture, and installation. The Contractor shall provide support structures and ceiling hanger systems as required.

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## 1.2 REFERENCES

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C80.1 (1995) Rigid Steel Conduit - Zinc Coated

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 123	(2000) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 153	(2001) Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM B 8	(1999) Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	(2002) Structural Welding Code - Steel
AWS D1.2	(1997) Structural Welding Code - Aluminum
AWS D10.7	(1986) Recommended Practices for Gas Shielded Arc Welding of Aluminum and Aluminum Alloy Pipe
AWS QC1	(1996) AWS Certification of Welding Inspectors

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE Std 383	(1974) Standard for Type Test of Class IE Electric Cables, Field Splices, and Connections for Nuclear Power Generating Stations (Reapproved 1992)
IEEE C2	(2002) National Electrical Safety Code
IEEE C37.20.2	(1999) Metal-Clad Switchgear
IEEE C57.13	(1993) Requirements for Instrument Transformers

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA FB 1	(2001) Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies
NEMA ICS 1	(2001) Industrial Control and Systems
NEMA ICS 2	(2002) Industrial Control and Systems Controllers, Contactors, and Overload Relays Rated Not More Than 2000 Volts AC or 750 Volts DC
NEMA ICS 6	(1993; R2001) Industrial Control and Systems Enclosures
NEMA WC 57	(1995; Rev 2 September 1998) Control Cables

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NEMA WC 70	(1999) Nonshielded Power Cables rated 2000 Volts or Less for the Distribution of Electrical Energy
NEMA WC 74	(2000) 5-46 kV Shielded Power Cable for Use in the Transmission and Distribution of Electric Energy
NEMA VE 1	(1998) Metal Cable Tray Systems
NEMA VE 2	(2001) Cable Tray Installation Guidelines

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

- NFPA 70 (2002) National Electrical Code  
UNDERWRITERS LABORATORIES INC. (UL)
- UL 44 (1999; Rev thru Jun 2001) Thermoset-Insulated Wires and Cables
- UL 50 (1995; Rev thru Nov 1999) Enclosures for Electrical Equipment
- UL 360 (1996; Rev thru Aug 2001) Liquid-Tight Flexible Steel Conduit

1.3 SUBMITTALS

Submittals required by this section of the Technical Specifications shall be submitted for Government approval (GA) or for information only (FIO), and shall be submitted as stated below in accordance with SECTION 01330. Shop drawings and catalog cuts are required to indicate complete compliance with the contract specifications. All shop drawings and catalog cuts shall include the project name, and contract number.

Submit the following within 60 days after contract award:

SD-01 Data

Conduit, fittings, and hangers; GA

Nameplates; GA

Wire and Cable; GA

Terminal Blocks; GA

Cable Tray and Fittings; GA

Terminal Cabinet; GA

Instrument Transformers; GA

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Submit the following 90 days after contract award:

SD-04 Drawings

Control and Annunciation Panel Modification Drawings; GA

Transition/Connection Compartment Modification Drawings; GA

Terminal Cabinet Drawings; GA

Submit the following 30 days after contract award:

SD-06 Instructions

Sequence Of Work Plan; GA

Circuit Breaker Installation Procedure; GA

Static Start System Installation Procedure; GA

Submit the following 14 days after completion of tests.

SD-09 Reports

Circuit Breaker Test; GA

Static Start System Test; GA

1.4 GENERAL REQUIREMENTS

1.4.1 Work Conditions

The work under this contract is at the existing Richard B. Russell Powerhouse and subject to the safety clearances and operating procedures currently practiced by the project. All the construction activities shall be coordinated with the GQAR so that the construction will not adversely affect the daily operation of the powerhouse. Safety clearances shall be obtained before opening, entering or working on any existing equipment such as power and motor control centers, switchboards, and alarm cabinets. All working areas shall be kept clean and orderly at all times. Tools and construction equipment shall be put away at the end of each workday. All discarded packing materials, wire ends and conduit pieces shall be placed in proper receptacles. Dust and other debris shall be prevented from entering electrical cabinets when drilling holes in existing concrete. Metal shavings shall be prevented from entering electrical cabinets when cutting conduit or drilling holes in cabinets or sheet metal. If the creation of dust or metal shavings cannot be avoided the work area shall be vacuum-cleaned immediately after the activity.

1.4.2 Materials, Equipment and Installation

New and unused materials and equipment shall be furnished and any defective material or equipment damaged in the course of installation shall be replaced or repaired. The removal of electrical equipment will include the

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disconnection of existing conduits, associated wiring, and cables. The existing wiring and cables disconnected shall be removed and replaced with new materials. Existing conduits still serviceable may be reused as shown in the drawings; otherwise the conduits shall be replaced with new materials. Testing shall be performed to check the installation of and the proper operational functions of the accessory electrical equipment. The installations shall be in accordance with the National Electrical Code, NFPA 70, and the National Electrical Safety Code, IEEE C2, except where otherwise specifically shown or specified, in which case the drawings and specifications shall govern. Omission of details on the drawings or in the specifications shall not be construed as permitting deviations from Code requirements.

1.4.3 Standard Products

Material and equipment shall be the standard products of manufacturers regularly engaged in the manufacture of these products and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening.

1.4.4 Corrosion Prevention

All equipment shall be protected to prevent deterioration from corrosion. The general requirements are specified below; however, other corrosion-resisting treatments that are the equivalent of those specified may be used.

#### 1.4.4.1 Fastenings and Fittings

Screws, bolts, nuts, pins, studs, springs, washers and other miscellaneous fastening and fittings shall be of corrosion-resistant material or shall be treated in an approved manner to render them resistant to corrosion. All fastenings that are to be exposed directly to the weather shall be of corrosion-resisting material.

#### 1.4.4.2 Corrosion-Resisting Materials

Corrosion-resisting steel, copper, brass, bronze, copper-nickel-copper alloys are acceptable corrosion-resisting materials.

#### 1.4.4.3 Corrosion-Resisting Treatments

Treatments shall be in accordance with ASTM A 123 or ASTM A 153.

#### 1.4.4.4 Finish

Final painting may be done in accordance with manufacturer's standard practice.

#### 1.4.5 Storage and Handling

Materials and equipment shall be suitably protected from dampness, dust and physical damage.

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#### 1.4.6 Nameplates and Escutcheons

Identifying nameplates are in addition to manufacturer's nameplates and shall be made of 1/6-inch thick laminated sheet plastic or of 1/32-inch thick anodized aluminum engraved to provide white letters on a black background. All nameplates shall be fastened to enclosures in proper positions with black finished round-head screws. In general, each pushbutton station or control switch shall be provided with an identifying nameplate in addition to an escutcheon plate to show operating position as shown in the contract drawings. Nameplates for cabinets shall be as shown in the contract drawings, or will be furnished by the Government when the Contractor's data is submitted for approval. Designations may be changed when shop drawings are submitted for approval.

### 1.5 CONTRACT DRAWINGS

#### 1.5.1 General

The contract drawings indicate the work to be accomplished in as much detail as is practical. Except for such modifications as may be required for coordination with equipment actually furnished, they constitute the working drawings for construction and for purchase of required materials.

#### 1.5.2 Departures from Drawings

If departures from the contract drawings are deemed necessary details of such departures and reasons for them shall be submitted not later than 30 days before scheduled installation date. No such departures shall be made without prior written approval. The control schemes shown on the contract drawings are not intended to exclude the Contractor's method for accomplishing the functions indicated. However, if any alternate equipment is approved, the

Contractor shall bear the cost and be responsible for furnishing and installing any additional wiring devices that are required.

#### 1.6 COORDINATION WITH OTHER WORK

The existing governors will be replaced by others during the same time frame as this contract. The Contractor shall coordinate with the COR for any other work being performed by others to avoid conflicting work at the same location in the powerhouse or at the same equipment.

### PART 2 PRODUCTS

#### 2.1 CONDUIT SYSTEMS

##### 2.1.1 Conduit

##### 2.1.1.1 Rigid Steel

Rigid steel conduit shall conform to ANSI C80.1 and shall be zinc-coated both inside and outside by hot-dip galvanizing method.

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##### 2.1.1.2 Flexible Steel

Flexible conduit shall be liquid tight metal and shall conform to UL 360, shall have a hot-dip galvanized steel core, copper ground wire and a waterproof extruded PVC cover.

##### 2.1.1.3 Fittings

Fittings for rigid conduit shall be threaded and conform to NEMA FB 1. Fittings for flexible conduit shall provide positive bonding.

#### 2.1.2 Outlet and Junction Boxes

##### 2.1.2.1 Sheet Metal

Sheet metal boxes and covers shall conform to UL 50.

##### 2.1.2.2 Cast Boxes

Cast boxes and covers shall conform to NEMA FB 1. All cast boxes shall be supplied with integral cast hubs or with factory-brazed hubs. All hubs shall be factory threaded.

#### 2.2 INSULATED WIRE AND CABLE

##### 2.2.1 General

All wire and cable used for power, lighting, control, metering, and relaying systems shall be provided by the Contractor and shall conform to the requirements specified herein. Characteristics, including conductor size, stranding, number of conductors, rated circuit voltage, cabling, and other requirements for each type of service, shall be as indicated on the drawings, or as specified under the detailed requirements of these specifications for the particular construction or use, unless otherwise stated.

##### 2.2.2 Wire and Cable Schedule

Wire and cable shall be furnished in accordance with the requirements of the Conduit and Cable Schedules, and as indicated on the drawings. Estimated quantities listed in the Conduit and Cable Schedules are approximate for bidding purposes.

### 2.2.3 Governing Standards

Materials, construction and tests, unless otherwise specified, shall conform to the applicable requirements of NEMA WC 70 and NEMA WC 74.

### 2.2.4 Rated Circuit Voltages

Wire and cable for circuits operating at 600 volts and below shall have minimum rated circuit voltages in accordance with Section 3 of NEMA WC 70.

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### 2.2.5 Conductors

#### 2.2.5.1 Material

Conductors shall conform to all the applicable requirements of Section 2 of NEMA WC 70 or Section 2 of NEMA WC 74 as applicable, and shall be annealed copper. Copper conductors may be bare, or tin- or lead-alloy-coated, if required by the type of insulation used.

#### 2.2.5.2 Minimum Wire Sizes

Minimum wire size shall be No. 12 AWG for power and lighting circuits; No. 10 AWG for current transformer secondary circuits; No. 14 AWG for potential transformer, relaying, and control circuits; and No. 16 AWG for annunciator circuits.

#### 2.2.5.3 Stranding

Conductor stranding classes cited herein shall be as defined in Appendix G of NEMA WC 70 and Appendix H of NEMA WC 74, as applicable. Lighting conductors No. 10 AWG and smaller shall be solid or have Class B stranding as defined in Table 1 of ASTM B 8. Any conductors used between stationary and moving devices, such as hinged doors or panels, shall be Class H or K stranding. All other conductors shall have class B or C stranding, except that conductors shown on the drawings, or in the schedule, as No. 12 AWG may be 19 strands of No. 25 AWG, and conductors shown as No. 10 AWG may be 19 strands of No. 22 AWG.

### 2.2.6 Insulation

#### 2.2.6.1 Insulation Voltage Rating and Insulation Level

The rated circuit voltage of the insulation shall be 600 volts for all circuits operating below 2,000 volts, with 100 percent insulation level. The rated circuit voltage of the insulation shall be 15,000 volts for all circuits operating above 2,000 volts, with 133 percent insulation level.

#### 2.2.6.2 Insulation Material

Insulation shall be cross-linked-thermosetting-polyethylene (XLPE) type, or an ethylene-propylene-rubber (EPR) type meeting the requirements of Section 3 of NEMA WC 70, or Section 4 of NEMA WC 74, as applicable. Polyvinyl chloride (PVC) insulation will not be accepted.

#### 2.2.6.3 Insulation Thickness

The insulation thickness for each conductor shall be based on its rated circuit voltage.

a. The insulation thickness for single-conductor cables and single conductors of multiple-conductor control cables used for control and related purposes rated below 2,000 volts shall be as required by Section 3 of NEMA WC 70.

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b. The insulation thickness for single-conductor cables rated above 2,000 volts shall be as required by Section 4 of NEMA WC 74.

#### 2.2.7 Shielding

Shielding, where specified for control cables rated below 2,000 volts, shall conform to the requirements of Part 4 of NEMA WC 57. Shielding shall be provided for all cables rated above 2,000 volts and shall comply with Sections 5 and 6 of NEMA WC 74.

#### 2.2.8 Jackets

All cables shall have jackets meeting the requirements of Section 4.1 of NEMA WC 70, or Section 7.1 of NEMA WC 74, as applicable, and as specified herein. Individual conductors of multiple-conductor cables shall be required to have jackets only if they are necessary for the conductor to meet other specifications herein. Jackets of single-conductor cables and of individual conductors of multiple-conductor cables, except for shielded cables, shall be in direct contact and adhere or be vulcanized to the conductor insulation. Multiple-conductor cables and shielded single-conductor cables shall be provided with a common jacket, which shall be tightly and concentrically formed around the core. Repaired jacket defects found and corrected during manufacturing are permitted if the cable, including the jacket, afterward fully meets these specifications and the requirements of the applicable standards.

##### 2.2.8.1 Jacket Material

The jacket shall be one of the materials listed below, in accordance with the applicable paragraphs of NEMA WC 70 and NEMA WC 74. Polyvinyl chloride compounds will not be permitted. Variations from the materials required below will be permitted only if approved for each specific use, upon submittal of sufficient data to prove that they exceed all specified requirements for the particular application.

- a. Neoprene, heavy-duty black.
- b. Chlorosulfonated polyethylene, heavy-duty.
- c. Chlorinated polyethylene, cross-linked, heavy-duty.

##### 2.2.8.2 Jacket Thickness

The minimum thickness of the jackets at any point shall be not less than 80 percent of the respective nominal thickness specified below:

a. Thickness of the jackets of the individual conductors of multiple-conductor cables shall be as required by Section 4.1 of NEMA WC 70, and shall be in addition to the conductor insulation thickness required by Section 3 of NEMA WC 70 for the insulation used. Thickness of the outer jackets or sheaths of the assembled multiple-conductor cables shall be as required by Section 4.1 of NEMA WC 70.

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b. Single conductor cables, if nonshielded, shall have a jacket thickness as specified in Section 4.1 of NEMA WC 70. If shielded, the jacket thickness shall be in accordance with the requirements of Section 4.1 of NEMA WC 70, or Section 7.1 of NEMA WC 74, as applicable.

#### 2.2.9 Identification

Only one color-code method shall be used for each cable construction type. Colored braids will not be permitted. Control cable color-coding shall be in accordance with Appendix E of NEMA WC 57. Power cable color-coding shall be black for Phase A, red for Phase B, blue for Phase C, white for grounded neutral, and green for an insulated grounding conductor, if included.

#### 2.2.10 Cabling

Individual conductors of multiple-conductor cables shall be assembled with flame and moisture-resistant fillers, binders, and a lay conforming to Part 5 of NEMA WC 57, or Section 5 of NEMA WC 70, as applicable, except that flat twin cables will not be permitted. Fillers shall be used in the interstices of multiple-conductor round cables with a common covering where necessary to give the completed cable a substantially circular cross section. Fillers shall be of a non-hygroscopic material, compatible with the cable insulation, jacket, and other components of the cable. The rubber filled or other approved type of binding tape shall consist of a material that is compatible with the other components of the cable and shall be lapped at least 10 percent of its width.

#### 2.2.11 Dimensional Tolerance

The outside diameters of single-conductor cables and of multiple-conductor cables shall not vary more than 5 percent and 10 percent, respectively, from the manufacturer's published catalog data.

#### 2.2.12 Inspection and Tests

Inspection and tests of wire and cable furnished under these specifications shall be made by and at the plant of the manufacturer, and shall be witnessed by the GQAR, unless waived in writing. The Government may perform further tests before or after installation. Testing in general shall comply with Part 6 of NEMA WC 57, Section 6 of NEMA WC 70, or Section 9 of NEMA WC 74, as applicable. Specific tests required for particular materials, components, and completed cables shall be as specified in the sections of the above standards applicable to those materials, components, and cable types. Tests shall also be performed in accordance with the additional requirements specified below.

##### 2.2.12.1 High-Voltage Test Source

Where applicable standards allow a choice, high-voltage tests for cables to be used exclusively on dc circuits shall be made with dc test voltages. Cables to be used exclusively on ac circuits shall be tested with ac test voltages. If both ac and dc will be present, on either the same or separate conductors of the cable, ac test voltages shall be used.

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##### 2.2.12.2 Flame Tests

All multiple-conductor and single-conductor cable assemblies shall pass the IEEE Standard 383 flame tests, paragraph 2.5, using the ribbon gas burner. Single-conductor cables and individual conductors of multiple-conductor cables shall pass the flame tests of Part 3 of NEMA WC 57, Section 6 of NEMA WC 70, or Section 7.1 of NEMA WC 74, as applicable. If such tests, however, have previously been made on identical cables, these tests need not be repeated. Instead, certified reports of the original qualifying tests shall be submitted.

#### 2.2.12.3 Independent Tests

The Government may at any time make visual inspections, continuity or resistance checks, insulation resistance readings, power factor tests, or dc high-potential tests at field test values. A cable's failure to pass these tests and inspections, or failure to produce readings consistent with acceptable values for the application, will be grounds for rejection of the cable.

#### 2.2.13 Packaging and Marking

The cables shall be furnished one length to a reel or coil. Each length, and the outside of each reel or coil, shall be plainly marked or tagged to indicate the cable length, voltage rating, conductor size, and manufacturer's lot number and reel number. Cables for exclusively dc applications shall be identified as such. Reels shall remain the property of the Contractor.

### 2.3 SPECIAL WIRE AND CABLE

#### 2.3.1 Control Panel Shop Wiring

Wiring for factory assembled control panels or assemblies of electrical components for miscellaneous equipment shall conform to NEMA WC 57, and NEMA WC 70, as applicable. All wire shall be single conductor stranded copper in accordance with Part 2 of NEMA WC 57. Insulation shall be rated for 600 volts with thickness in accordance with Section 3 of NEMA WC 70. Conductors shall be Class B or Class C stranding, except hinge wire shall be Class D or Class K stranding. Conductor size shall be No. 14 AWG minimum. The completed installation shall conform to all requirements of the National Electrical Code.

#### 2.3.2 Switchboard Wire

Wiring provided in the existing switchboard shall be single conductor #14 AWG, 600-volt, Type SIS, or approved equal meeting the requirements of UL 44. Stranding shall be Class B or Class C.

### 2.4 GROUND CONDUCTORS

Ground conductors shall be bare unless routed along with the phase conductors in a motor feeder circuit. The ground conductors shall be soft, or medium hard drawn Class A or Class B stranded copper cables.

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### 2.5 TERMINAL BLOCKS

#### 2.5.1 General - Control Signal and Current Transformer Secondary Types

Except for the diode terminal blocks, terminal blocks for control signal and current transformer secondaries shall be removable and of binding, fillister or washer-head screw type, or stud type with contact and locking nuts. Each terminal shall be not less than No. 10 in size, having length and space for connecting at least two No. 12 AWG conductors to each terminal. Terminal

blocks shall be provided to terminate all external cables and shall contain at least four spare terminals or 10 percent whichever is greater. White or other light colored marking strips, shall be provided for circuit designation. Each connected terminal of each block shall have the circuit designation or wire number placed on the marking strip with permanent marking fluid. Two reversible or spare marking strips shall be furnished with each block.

#### 2.5.1.1 Control Signal Type

All terminal blocks for control wiring, shall be sliding link disconnect molded or fabricated type with barriers, rated not less than 600 volts with 30 ampere capacity.

#### 2.5.1.2 Current Transformer Secondaries Type

Short circuiting type terminal blocks shall be furnished for all current transformer secondary leads as shown in the contract drawings and shall have provisions for short-circuiting together all leads from each current transformer without opening any circuit. Short-circuiting the terminals of only one current transformer shall not short-circuit the terminals of any other current transformer.

#### 2.5.2 Diode Terminal Blocks

Diode terminal blocks shall be provided for connections between the new external connection terminal blocks and the existing annunciator relay panel terminal blocks as shown in the contract drawings. Diode terminal blocks shall be modular, rail mounted devices, rated not less than 600 Volts and 20 Amperes. The insulating body for each block shall be made of Polyamide 6.6 and withstand continuous exposure to a temperature of 100°C without degradation. The terminal connections shall be pressure type with length and space for connection of at least (2) two No.12 AWG stranded conductors on each end of the feed-through. The terminal contacts shall be designed to prevent the terminated wires from being loosened by vibration or by normal pulling forces. Each terminal block shall include a component plug that can be plugged into the top of the terminal block. The component plug shall contain a 1N4007 diode such that when the component plug is plugged into the terminal block, the diode connects the two terminals on the terminal block. Mounting rails and end covers shall be provided for the terminal block assemblies. White or other light colored marking strips, shall be provided for circuit designation. Each connected terminal of each block shall have the circuit designation or wire number placed on the marking strip with permanent marking fluid. Twenty percent reversible or spare marking strips shall be furnished. At least four spare terminals or 10 percent, whichever is greater, shall be furnished.

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### 2.6 CABLE TRAY

Cable trays, hardware, and supporting systems shall be in accordance with the requirements of NEMA VE 1. Cable trays shall form a wireway system, and shall be of nominal 4-inch depth. Cable trays shall be constructed of zinc-coated steel, hot-dip galvanized after fabrication. Trays shall include splice and end plates, dropouts, grounding connector plates, hold-down clamps or fasteners, and miscellaneous hardware. Edges, fittings, and hardware shall be finished free from burrs and sharp edges. Fittings shall have not less than the load-carrying ability of straight tray sections and shall have manufacturer's minimum standard radius. Radius of bends shall be 12 inches minimum, horizontal or vertical, unless otherwise approved. Rung spacing shall be on 6-inch maximum centers. Connectors and splice plates shall be of the rigid type with rivet or bolt and lock washer fasteners and shall provide electrical continuity between adjacent sections. Supporting struts, braces and hardware shall be provided as required and shall be the tray manufacturer's standard product or as recommended by the tray manufacturer.

All bolts, fasteners and other hardware shall have an approved corrosion-resistant finish.

## 2.7 CONTROL RELAYS

Control relays shall be of the electrically operated, magnetically held type, and shall be 125 VDC. Contacts provided shall be a minimum of 3 N.O. contacts and 3 N.C. contacts, or as otherwise required for the indicated function. Contact rating designation shall be A600 or N600, as required, 10 amperes continuous. Relays shall meet the applicable requirements of IEEE C37.90, NEMA ICS 1 and NEMA ICS 2. Where timing relays are used, they shall have instantaneous and time delay contacts as indicated. The timer shall have a front-accessible dial for manual adjustment of the time delay over the indicated range. Where equipment ratings are not compatible, the Contractor shall provide whether or not shown the necessary interposing relays for a compatible interface with the government-furnished equipment.

## 2.8 INSTRUMENT TRANSFORMERS

### 2.8.1 Current Transformers

Current transformers, except as otherwise specified, shall conform to the applicable requirements of IEEE C57.13 and IEEE C37.20.2. They shall be of the dry or compound-insulated type and shall be provided with a suitable means of mounting and for grounding the frame. Each current transformer secondary lead shall be connected to a terminal block of the short-circuiting type and shall be conveniently located to permit short-circuiting the secondary windings without requiring access to the primary bus compartments. The polarity of the current transformers shall be plainly marked. Window or bushing type current transformers shall have minimum full-wave insulation level of 10 kV and, when installed, shall meet the requirements of 95 kV BIL class as listed in Table 2 of IEEE C57.13 for test voltage applied between the bus and transformer secondary terminals. All current transformers shall be suitable for continuous operation at the full rated voltage and current at a frequency of 60 Hz. All current transformers shall be designed to withstand, without damage, the thermal and mechanical stresses resulting from

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short circuit currents corresponding to ratings of the breakers in the circuits to which they are connected. The quantity, ratios, accuracies, and functions of the current transformers shall be as shown.

### 2.8.2 Potential Transformers

Potential transformers, except as otherwise specified, shall conform to the applicable requirements of IEEE C57.13. Transformers shall be 14,400-120 volt and not be less than 750 volt-ampere capacity with thermal rating for a 55 degrees C ambient. The voltage transformers shall have an ANSI accuracy classification of 0.3 or better for each standard burden W, X, Y, Z and 1.2 ZZ. The voltage transformers shall be of the indoor dry or compound-filled type with the minimum full-wave impulse level not less than 95 kV. The transformer shall be protected with removable primary and secondary fuses. Fuses shall be installed in each ungrounded lead and located adjacent to the transformers in an easily accessible place. Two primary fuses shall be provided for each transformer connected in open-delta. One primary fuse shall be provided for each transformer connected in wye. Fuses shall be of current limiting type, able to withstand maximum possible energizing current, but capable of interrupting the circuit in case of a short circuit on the secondary winding.

## 2.9 CABINETS AND ENCLOSURES

Cabinets and enclosures shall be as indicated on the drawings and shall comply with the applicable requirements of NEMA ICS 6 and UL 50.

### PART 3 EXECUTION

#### 3.1 SEQUENCE OF WORK

Not more than two units may be out of service at the same time unless otherwise approved. Outages shall not exceed ten weeks duration. Units 1-8 at the Richard B. Russell Powerhouse generate by day or night as required. Units 5-8 may also pump at night as required. The Contractor shall submit for approval a detailed sequence of work that will provide an acceptable generating capacity and allow the use of at least two of Units 5-8 for night-time pumping during construction as far as is practicable. Units shall be taken out of service in pairs that share a common transformer: 1 and 2, 3 and 4, 5 and 6, 7 and 8. The approved sequence of work shall be reviewed on a weekly basis and adjusted as required to maintain an acceptable generating and pumping capability throughout the construction period. The existing controls shall be maintained for this purpose as far as is practicable by installation of temporary jumpers in the existing control system to allow operation of some units while other units are out of service. Richard B. Russell Project personnel will install temporary jumpers. The Contractor's plan shall include a minimum of two days lead time for notification of Project personnel that temporary jumpers will be required prior to starting the associated work by the Contractor. Project personnel will remove temporary jumpers after the associated work is completed and the associated equipment has passed operational testing. The Contractor's plan shall also address the movement of the Government-furnished Input and Output transformers as described in Paragraph 3.3.3 below.

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A suggested general sequence for the Contractor's consideration is as follows:

a. Install the Government-furnished static start system and appurtenances, stopping short of connecting the current-limiting reactors to the isolated-phase bus and the output breaker to the starting bus. Connect as much of the static start system controls as is practicable. Units 1-8 remain available to generate by day and Units 5-8 remain available to pump by night during this time.

b. Take Units 7 and 8 out of service. Replace Units 7 and 8 generator breakers and isolated-phase bus. Connect the static start system to the isolated-phase bus and to the starting bus. Connect any remaining static start system controls and Units 7 and 8 controls. Units 7 and 8 and the static start system may be isolated from the existing starting bus, leaving Units 5 and 6 available to pump from the existing starting bus during this time. Units 1-6 are also available to generate by day during this time.

c. After Units 7 and 8 and the active portion of the static start system have passed all operational tests, including generating and pumping, they can be put back into service. Then take Units 5 and 6 out of service and replace the generator breakers and isolated-phase bus. The existing starting bus at Units 2-4 and the starting bus breakers at Units 2 and 3 will not be used again and can be removed. Units 1-4 and Units 7 and 8 remain available to generate by day and Units 7 and 8 are now available to pump by night using the static start system during this time.

d. After Units 5 and 6 and the remaining portion of the static start system have passed all operational tests, including generating and pumping, they can be put back into service. Then take Units 3 and 4 out of service and

replace the generator breakers and isolated-phase bus. Units 1 and 2 and Units 5-8 are available.

e. After Units 3 and 4 have passed operational tests they can be put back into service. Then take Units 1 and 2 out of service and replace the generator breakers and isolated-phase bus. Units 3-8 are available.

f. After Units 1 and 2 have passed operational tests they can be put back into service.

### 3.2 REPLACEMENT OF CIRCUIT BREAKERS

#### 3.2.1 Removal of Existing Main Unit Circuit Breakers

Remove existing insulating oil from four unit circuit breakers (12 interrupter tanks total, with approximately 150 gallons of oil each tank). Remove the existing circuit breakers and associated isolated-phase bus and equipment as shown in the contract drawings. Remove existing control cabling from the circuit breaker enclosures to the Generator Actuator cabinets and the Excitation cubicles and to the main control panels. Existing embedded conduits from the Switchgear Gallery cable trays to the circuit breaker enclosures shall be abandoned. Conduits stubbed up into the enclosures above

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the transformer deck shall be cut off flush with the finished floor and plugged with a minimum of two inches of non-shrink grout prior to application of the deck coating system specified in SECTION 09980.

#### 3.2.2 Install SF6 Unit Circuit Breakers

The equipment will consist of eight (8) Government-furnished SF6 gas circuit breakers rated 15 kV, 5,000 amperes, with control cabinets, breaker CT cabinets, and isolated-phase bus. The erection engineer will provide direction for the correct performance of this work. Any welding of isolated-phase bus required on site shall be performed in accordance with the applicable requirements of AWS D1.1, D1.2, D10.7, and QC1. The work shall include, but not be limited to: inspecting all breaker components for shipping damage; installing mounting hardware; installing the breakers and cabinets; terminating and grounding the breakers; providing control conduits and cabling as indicated; charging the breakers with SF6 gas as necessary after having been in storage; testing and placing the breakers in an approved operating condition.

#### 3.2.3 Replacement of Current Transformers

The four Government-furnished circuit breakers for Units 5-8 must each have one set of their single-core current transformers replaced with one set of double-core current transformers. To match the existing equipment, the current transformers shall be as directed by the manufacturer of these Government-furnished circuit breakers, and installed under the supervision of the circuit breaker manufacturer's erection engineer.

#### 3.2.4 Control Conduits and Cabling

The Contractor shall provide conduits from the Switchgear Gallery cable tray to the new circuit breaker control panels. The Contractor shall provide control cabling from the circuit breaker control panels to the Generator Actuator cabinets and the Excitation cubicles in the Turbine rooms, and to the main control panels and the 125VDC Distribution Board in the Main Control room.

### 3.2.5 Tests

After assembly the breakers shall be tested to verify accuracy and completeness of the installation. All testing shall be witnessed by the GQAR and his name and the date of test shall appear on all test documents. Testing shall include but not be limited to: control and secondary wiring; timing tests by time-travel recorder; mechanical operation tests (consisting of at least five (5) close-open cycles); dielectric tests of the major insulation; gas tests; power factor tests. During the mechanical operation tests all control circuit functions shall be employed during the cycle of test, and the operation of all auxiliaries shall be checked throughout the test cycle. Test reports shall be submitted in accordance with SECTION 01330.

### 3.3 INSTALLATION OF STATIC START SYSTEM

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#### 3.3.1 General

The location and general arrangement of the electrical cabinets (SFC controllers) and ancillary equipment (current-limiting reactors, input/output SF6 circuit breakers, input/output transformers, isolated-phase bus taps, conduit and wiring) are as shown in the contract drawings. Modifications of the equipment arrangement of the device requirements shown shall be subject to approval. Isolated-phase bus and input/output breaker installation shall comply with the requirements of paragraph 3.2.2.

#### 3.3.2 Modifications to Existing Main Control and Annunciation Cabinets

The existing generator main control and annunciation cabinets, located in the powerhouse control room will require minor modifications as a result of the generator circuit breaker replacements. Cabling requirements between the cabinets and circuit breakers are described in Paragraph 3.2. The Government may provide to the Contractor additional control and annunciation interfaces if required. The Contractor shall prepare the red-marked working drawings necessary for the installation of the generator circuit breakers. These drawings shall include necessary modifications to control and annunciation wiring, and protective relaying. All drawings modified shall be submitted for approval a minimum of 30 calendar days prior to the performance of work. The Contractor shall prepare as-builts of these modified drawings in accordance with SECTION 01780, and shall make as-built changes to the original record tracings, in the same format. Front panel voids resulting from the removal and/or installation of equipment on the control cabinets shall be fitted with a metal backing plate on the rear of the panel, filled with body putty, sanded for a smooth front appearance, and painted to match the existing cabinet.

#### 3.3.3 Movement of Government-Furnished Input and Output Transformers

The Government-furnished Input and Output transformers are heavy enough to pose a threat to the existing generator gallery floor structure if left stationary during movement across the powerhouse. The Contractor shall include in the Sequence of Work Plan the methods to be employed to move these transformers into the powerhouse and across the floor of the generator gallery and switchgear gallery. Prior to being set upon their final location for installation, these transformers shall be moved only one at a time and shall be kept in continuous motion while anywhere on the floor of the generator gallery and on the front part of the floor of the switchgear gallery.

### 3.4 CONDUIT SYSTEMS AND CABLE TRAYS

#### 3.4.1 Conduit Installation

All leads from the circuit breaker devices and accessories shall be run in rigid galvanized conduit and connected to terminal blocks in the cabinet, with the exception that short lengths of cables will be permitted between individual device terminals and nearby connection boxes. All conduit runs installed shall be terminated at devices or connection boxes and at the terminal cabinet in tapped holes having not less than 3-1/2 pipe threads, or in standard pipe-threaded couplings or nipples integral with or welded to the device or cabinet. Similar pipe-threaded connections shall be provided on

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the terminal cabinet for attaching incoming conduit. Other conduit connections shall be made with cast metal boxes and outlet fittings having threaded outlets and gasketed covers. No running threads on conduit will be permitted. Conduit, fittings and accessories shall be installed in accordance with details shown and as specified herein.

a. All conduit bends shall have a radius of not less than ten times the conduit's inside diameter.

b. No threadless fittings or running-thread couplings shall be used on conduit runs.

c. Metal conduits shall be cut only with a tool approved for the purpose. Roller type pipe cutters shall not be used on conduits. All cuts shall be square and the conduit opening shall not be constricted. After cutting and threading, conduit ends shall be reamed to remove rough edges and burrs and the entire conduit shall be thoroughly cleaned to remove all cuttings, dirt and oil from its interior. Threads shall be clean cut. Threaded joints in metal conduit and terminations in cast boxes shall have the threads coated with an approved joint compound, and shall be screwed tight to make the joint watertight and to provide electrical continuity of a given conduit system. Suitable watertight conduit hubs and bushings shall be provided where conduit terminates within a box, terminal cabinet or accessory that has no threaded hub or fitting to receive threaded conduit.

d. All conduit shall be installed in such a manner as to insure against trouble from the collection of trapped condensation and all runs shall be arranged to avoid traps wherever possible.

e. Pull boxes shall be furnished and installed, complete with covers, in conduit runs as required by the NEC and good practice in the trade, regardless of whether the boxes are specified on the drawings.

f. Conduit shall be installed with a minimum of bending and cutting. Conduits not dimensioned as to location shall be installed approximately where shown with limited adjustment to avoid interference with other work. Conduit shall be rigidly attached with approved supports and anchors to the surface over which it is run. The maximum spacing of supports for the exposed conduit shall be 8 feet. Supports for exposed conduit on concrete surfaces shall be fastened securely to the concrete with approved anchors. Wooden, fibrous, or similar plugs inserted into the concrete will not be accepted.

g. The entire metallic conduit system installed by the Contractor shall be electrically continuous and thoroughly grounded. No welding or brazing of the grounding conductor to the conduit will be allowed. All grounding connections to the conduit shall be made by means of grounding bushings or by an approved pressure type connector.

h. Conduits terminating in cast boxes shall be made up in approved threaded hubs unless otherwise indicated. Cast boxes and enclosures with threaded hubs shall be provided with proper size hubs to fit conduit being installed. Threaded reducers will not be permitted.

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i. All conduits, either new or existing reused, shall be clearly identified with the conduit designation by metallic embossed markers. Markers shall be securely fastened to the conduit's junction box or pull box, where conduits enter or leave cable trays, and as required at other points of access. Each conduit marker shall follow existing Project nomenclature.

#### 3.4.2 Exposed Lengths of Conduit, Over 600 Volts

In addition to the above requirements, exposed lengths of conduit containing power conductors operating at more than 600 volts shall have two red bands 2 inches (50 mm) wide spaced 8 inches (200 mm) apart painted near each coupling; the intervening space between the red bands shall be painted white, and on the white space the voltage shall be stenciled in black.

#### 3.4.3 Cable Trays

Cable trays shall be supported in accordance with the recommendations of the manufacturer and the applicable portions of NEMA VE2, but at no more than 6 foot intervals with minimum size 1-5/8 inch galvanized steel channels. Contact surfaces of aluminum connections shall be coated with an antioxidant compound prior to assembly. Adjacent cable tray sections shall be bonded together by connector plates of an identical type as the cable tray sections. The cable tray shall be grounded in accordance with the applicable provisions of NFPA 70.

### 3.5 WIRE AND CABLE

#### 3.5.1 General

For the purposes of this contract, the term "internal wiring" shall be used to designate the Contractor's factory installed wiring in equipment furnished for installation, and the term "external wiring" shall be used to designate the Contractor's field installed wiring. Conduit and cable schedules for the existing transformer wiring are as shown in the contract drawings, and shall contain information on conduit and cable numbers, sizes and estimated lengths, number and insulation ratings of conductors, the function and operating voltage of circuits, and the terminations of conduits and cables. Although estimated cable lengths will be shown on the cable schedule, the Contractor shall be responsible for determining the actual cable length required to make an installation without splices.

#### 3.5.2 External Wiring

All external wire and cable shall conform to paragraph 2.2 of these specifications. All wire and cable shall be installed in accordance with National Electrical Code requirements. All necessary materials, tools and equipment required for proper handling and installation of wire and cable in conduits, cable trays, and elsewhere shall be furnished. Except for spares, each wire and cable shall be connected to the associated equipment at both ends, and shall be continuous and without splices between the equipment termination points. Wire and cable shall be pulled in a manner that will preclude damage to the conductor, insulation or jacket. Any cable damaged during installation shall be removed and replaced. Installation of wire and cable shall include installation of all supporting devices and all

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terminations required to complete the circuits as required. Wire and cable shall not be pulled into conduit runs until the conduit has been checked and determined to be clean and dry by pulling a clean, dry, tight-fitting rag through each run (this includes existing conduits as well as new conduits). Only approved lubricants may be used to facilitate pulling of conductors. Cable trays shall be cleaned of all dirt and trash before pulling cable. Cables shall be placed straight and parallel in the trays.

### 3.5.3 Terminations

All cable and wire connections shall be made at terminal blocks. The shield and shield insulating jacket of shielded signal cables and conductors, if applicable, shall be maintained to a point as close to the terminals as possible. The shield insulating jacket shall not be stripped from the shield except where necessary to make the ground connection. All signal cable shields shall be grounded at one end only.

### 3.5.4 Identification

All multiple-conductor cables shall be clearly identified with the cable designation by either embossed one-inch diameter brass tags or by embossed aluminum band markers. Tags or band markers shall be securely fastened to the cables at each termination, junction or pull box, where cables enter or leave cable trays, and as required at other points of access. Wires and individual conductors of control and power cables shall be identified with non-metallic tube-type markers at each termination. Tube-type markers shall be suitable for contact with rubber or neoprene or plastic. Tubing shall be sized to fit the wire being marked and shall have black marking on a light colored background. Installed markers shall be uniform in position on the wire and legends shall be visible when wires are terminated on terminal blocks or equipment. A written certificate from an approved independent testing laboratory shall be furnished to indicate that the markers will not stain or discolor after 20 years service when subjected to an accelerated aging test while in contact with wire insulating materials. Identification on each tag and marker shall include both the source and destination location as shown in the contract drawings or as directed.

### 3.5.5 Tests

After installation, but just prior to terminal connection, each conductor shall be tested as follows:

a. A 1000-volt "Megger" test shall be performed with all other conductors in each cable or conduit grounded. The final insulation resistance of each conductor shall not be less than one megohm.

b. A continuity test of each conductor from terminal to terminal shall be performed.

c. Suitable records shall be kept of all tests, indicating the "Megger" readings, high voltage tests, continuity test, and conductor identification markings. A duplicate record of all tests shall be furnished the Contracting Officer. Prior to testing, the test record form shall be submitted for approval.

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d. Any length of wire or cable failing under the above tests shall be replaced.

e. The Contractor shall furnish all instruments and personnel for these tests.

f. Tests shall be witnessed by the GQAR and the test form shall provide room for the GQAR's signature. Test reports shall be submitted in accordance with SECTION 01330 within 30 days after test completion.

### 3.6 GROUNDING

Ground connections shall be made complete to all equipment installed under this contract whether or not specifically shown or detailed on the drawings. The main items to be grounded consist of steel structures, piping, machinery, motor frames, metal framework supporting or surrounding electrical equipment operating at 480 volts or more, cabinets, conduit, transformers, and lighting panelboards. Where required to make conduits and other metallic runs electrically continuous, approved copper jumpers or bonding shall be provided.

#### 3.6.1 Ground Conductors

Ground conductors shall be installed as continuous pieces of copper cable whenever possible. Exposed ground cable runs shall be supported to follow conduit, equipment or concrete wall contours. Support clamps or clips shall be of corrosion resistant metal and existing equipment bolts or screws shall be used where possible for fastening. Drilling of equipment housings or frames will be permitted only when approved. Concrete anchors shall be used for wall fastening.

#### 3.6.2 Ground Connections

All exposed connections and taps shall be made with approved bolted or compression connectors unless otherwise shown on the drawings. Soldered, brazed, or welded type connections will not be permitted.

### 3.7 DISPOSAL OF REMOVED EQUIPMENT

All removed equipment shall become the property of the Contractor.